

CORK CITY COUNCIL



Minimum Engineering Requirements for Residential Site Development Works

**Version 1.6
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FOREWORD

These are the approved engineering design and construction standards for Cork City Council –for residential developments to be taken in Charge. The document is for the purposes of providing guidance for developers for construction of developments, infrastructure and services.

It sets out best practice and general requirements of the LA for a development to be suitable for taking in charge.

As it may impact upon the design and layout of a larger development (in terms of roads, junctions etc) it is recommended that the developer consult with the relevant Cork City Council Departments at design stage.

In the case of developments that are to be subject to a Part 8 planning procedure this document is to be read in conjunction with the document ‘Procedures to be adopted by Housing Department for all Planning Applications under Part 8 of the Planning and Development Act 2001’

Generally all works shall be in accordance with the publication “Recommendations for Site Development Works for Housing Areas” published by D.O.E. in October 1998, the N.R.A. “Specification for Road Works” and the “Traffic Management Guidelines” as published by the DTO and Dept. of Transport (2003). Where there is any conflict between this Engineering Requirements document and these publications, the Engineering Requirements document shall prevail.

This publication does not contain all of the possible solutions to site development design problems and designers should be encouraged to propose imaginative alternatives, subject to approval by Cork City Council.

References to European, Irish or British Standard Specifications and any other published specifications, are to the latest edition current at the time of publication of this document. However, if this edition of the technical specification is subsequently revised or updated by the issuing body, the new version shall be deemed to apply, unless approval is obtained to the contrary.

This Document gives guidance within each section on the procedures that need to be adopted by developers and contractors, at design stage and both prior to and during construction ,to ensure that the works when completed will be of a standard that can be taken in charge by the Local Authority

Section 1: Overview and General Requirements

1.1 Scope

This document sets out standards, including design and workmanship criteria, for roads, services and Landscaping associated with site development works. The Engineers Minimum Requirements covers the following:

1.1.1 Excavation within Public Roads

- 1.1.2 Roads**
- (a) Cul-de-sacs and minor through roads.
 - (b) Main Access roads.
 - (c) Footways designed to cater for pedestrian traffic generated by the development.
 - (d) Traffic Lighting / Traffic Management
 - (e) Public Lighting.

1.1.3. Foul and Storm Sewers designed to cater for the development comprising pipes up to 600mm diameter within the development, laid at depths of cover of up to 6.0m.

1.1.4. Watermains and water service pipes comprising pipes up to 225 mm diameter within the development

1.1.5. Landscaping: Soft Landscaping in Public Open Spaces

1.2 Definitions For the purpose of this document the following definitions apply: -

1. **Local Authority:** Cork City Council
2. **Developer:** The person, company or public body that undertakes the development works and from whom the Local Authority would take the development in charge.
3. **Approval:** "Approval" and "Approved" mean approval in writing by the Local Authority, of proposals submitted by the developer. This meaning does not extend to a planning application for "approval", unless it is specifically stated as such.
4. **Road:** A way for vehicles and other types of traffic, including any street, lane, footpath, square, court, alley or passage, bridge, viaduct, underpass, subway, tunnel, overpass, overbridge, flyover, carriageway (whether single or multiple), pavement, footway, any weighbridge or other facility for the weighing or inspection of vehicles, toll plaza or other facility for the collection of tolls, service area, emergency telephone, first aid post, culvert, arch, gulley, railing, fence, wall, barrier, guardrail, margin, kerb, lay-by, hard shoulder, island, pedestrian refuge, median, central reserve, channelliser, roundabout, gantry, pole, ramp, bollard, pipe, wire, cable, sign, signal or lighting forming part of the road, and any other structure or thing forming part of the road and necessary for the safety, convenience or amenity of road users or for the construction, maintenance, operation or management of the road or for the protection of the environment, or prescribed by the Minister

5. **Roadworks:** Roadworks are defined as repairs, maintenance, alterations, improvements or installations or any other works to, above or under a public road. Works on the carriageway and footpath, where public road and footpath space is temporarily unavailable for public use.
6. **Footway:** That portion of any road associated with a roadway, which is provided primarily for use by pedestrians.
7. **Drain:** Any underground pipework or conduit used for the conveyance of foul water or surface water, which is not intended to be taken over and maintained by the Local Authority.
8. **Sewer:** Any underground pipework or conduit used for the conveyance of foul water or surface water, which is intended to be taken over and maintained by the Local Authority.
9. **Foul Water:** Waste water, or trade effluent, or water containing excreted matter, whether human or animal.
10. **Surface Water:** The run-off of rainwater from roofs and paved ground surfaces.
11. **Watermain:** A pipe for the general distribution of water in a water supply system, not being a service pipe.
12. **Service Pipe:** A pipe for the conveyance of water from a watermain to an individual premises.

1.3 Technical Specifications and Materials

1.3.1 Specifications: Within this document, technical specifications are either provided directly or indirectly by reference to:

1. An Irish Standard Specification, identified by IS followed by a number and the year of publication.
2. A British Standard Specification, identified by BS followed by a number and the year of publication.
3. A harmonized European Standard Specification, identified by IS EN followed by a number and the year of publication.
4. Other published specifications, identified by their titles.

References to Irish, British and harmonized European Standard Specifications and any other published specifications, are intended to be the latest edition current at the time of publication of this document. However, if this edition of the technical specification is subsequently revised or updated by the issuing body, the new version should be deemed to apply, unless approval is obtained to the contrary.

The standards given shall be deemed acceptable. Standards other than those given may be used with approval. The alternative materials and forms of construction given are suitable for normal situations. Where exceptional circumstances exist the Local Authority may instruct the Developer to use particular materials or form of construction. Requirements, including specification of workmanship, necessary for the proper completion of the works, and not covered in this document, shall be subject to approval.

1.3.2 Materials: All works should be carried out with proper materials. Proper materials means materials which are fit for the use for which they are intended and for the conditions in which they are to be used, and includes materials which:

1.3.2.1: Bear a CE Marking in accordance with the provisions of the Construction Products Directive; or

1.3.2.2: Comply with an appropriate harmonized standard, European technical approval or national technical specification as defined in article 4(2) of the Construction Products Directive; or

1.3.2.3: Comply with an appropriate Irish Standard or Irish Agreement Board Certificate or with an alternative national technical specification of any State which is a contracting party to the Agreement on the European Economic Area, which provides in use an equivalent level of safety and suitability.

1.4 Consultation with Local Authority

1.4.1 Prior to lodging a Planning Application The Developer shall establish in consultation with the Cork City Council:

1.4.1.1: Road Reservations, road widening lines and whether he/she shall be required to construct any roads other than those within the scope of this document. If such roads are to be constructed the Developer shall comply with the requirements of Cork City Council.

1.4.1.2: The type of drainage system to be used, areas external to the development area whose drainage must be catered for, estimated discharge from such areas, and outfall points for drainage and conditions under which is shall be accepted. Where the drainage layout is such as to require one or more connections to a public sewer the Developer shall ascertain whether such connections will be carried out by Cork City Council. Where these connections will be carried out by the Developer he/she shall comply with the requirements of Cork City Council.

1.4.1.3: The layout of the proposed water main network, the need to up size / replace existing pipe work, the number of connections to the existing network, metering requirements, the particulars of individual connections and shutdowns.

1.4.2 Information to be submitted with Planning Application for Private Residential Development:

Requirements for the lodgement of valid planning applications are set out in Article 23 of the Planning and Development Regulations, 2001 (as amended); more details are available at www.corkcity.ie.) In addition to basic validation requirements, Cork City Council will likely require supplementary information, similar to some of the items noted in Section 1.4.3 below. Whilst failure to supply the supplementary information will not invalidate the planning application, it could result in a request for Further Information and subsequent delay in a decision on an application. Applicants may contact Cork City Council to confirm what additional information beyond validation requirements may be required.

1.4.3 Information Required for Part 8 Planning Application

The Developer shall submit his/her proposals, in triplicate, to Cork City Council as follows: -

1. Site location map to a scale of 1:1000, showing north point and details of existing adjacent developments.
2. A survey map(OS Datum Malin Head) to scale of 1:500 showing the following details: -
 - (a) Existing ground contours at 1 metre intervals.
 - (b) The location of boundaries, trees and structures within the site and the location and levels of existing utilities including those within the site and those external to the site that will be affected by the development.
3. A plan showing the layout of proposed water mains and service connections including pipe types and sizes, positions of valves, hydrants, air valves, boundary boxes, meters and other associated fittings.
4. A plan showing the Layout of Public lighting together with Specification

5. A plan showing proposals for tree planting and landscaping and for the preservation of existing healthy trees and other features.
6. Longitudinal sections and cross-sections of roads showing existing and proposed levels, gradients vertical curves and details of proposed road construction.
7. Longitudinal sections of proposed sewers (foul and surface water) showing existing and proposed ground levels, invert levels, manhole positions, gradients, sizes of sewers, types and classes of pipes and types of bedding.
8. Longitudinal sections of proposed watermains showing existing and proposed ground levels, sizes of pipes, types and classes of pipes and positions of valves and hydrants.
9. Drainage design calculations sufficient to be interpreted by the Local Authority.
10. Proposals for dealing with existing surface and underground watercourses within the development area.

Note 1 Layout plans shall be to a scale of not less than 1:500, sections shall be to a horizontal scale of not less than 1:500 and a vertical scale of not less than 1:100.

Note 2 Levels shall be related to Malin Head Ordnance Survey Datum

1.5 Pre -Construction Stage

1.5.1 Bond: The Developer shall provide - to the satisfaction of the Planning Authority - adequate security for the provision of Roads, Footpaths, Sewers, Watermains, Public Lighting, Open Spaces and other Services connected with the development, together with their satisfactory completion and subsequent maintenance until ultimately taken in charge by Cork City Council. The security shall be in the form of a Bond provided by a Banking or Insurance company acceptable to the Planning Authority. For Part 8 Planning Applications the Bond figure will be calculated by Cork City Housing department in consultation with the various Engineering Departments. In all other cases the Bond will be calculated by the Planning Department. No construction work is to commence on site until such time as the Bond is in place.

1.5.2 Construction Drawings: the developer shall submit for written approval all drawings and specifications reports or other documentation required by condition of the grant of relevant permission prior to work commencing on site.

1.5.3 Commencement Notice: Before any site development works commence, the Developer shall forward a copy of the Commencement Notice, to Building Control Department. The Notice shall state the dates planned for starting any form of site development works, i.e. site clearance sub-base or road-base construction, road surfacing, footways, footpaths, kerbs, drainage, water, open spaces etc

1.6 Construction Stage

1.6.1 Utilities and other underground services: The Developer shall comply with the requirements of statutory undertakers and public utility companies responsible for services. The Developer shall install services or necessary ducting for services under footways or carriageways before the carriageway surface and pavements are completed.

- (a) **Location** - All services shall be laid underground. Foul and surface water (storm) sewers shall be usually laid in roadways.
- (b) **Natural gas mains** shall normally be laid in footways but may be accommodated in grass verges if provided.
- (c) **Electric and telecommunication cables** shall be laid under footways except where it is necessary for such services to cross the roads, in which case they shall cross at right angles in approved ducts. These ducts shall be installed before the roadway surface is completed.
- (d) **Footways and verges** - or footways only, where applicable - shall therefore be wide enough to accommodate these services. E.S.B. mini-pillars or other cabinets shall be avoided; if necessary however they shall not protrude onto the public footway, and be designed so as not to present a hazard to the public or present security or nuisance risk to adjoining households. Design of cabinet shall be as such as to inhibit fly posting or graffiti.
- (e) **In the case of Cable T.V. ducts**, the Developer shall lay ducts underground from the trunk line to the nearest structure, and subsequently underground between adjacent separate structures. Provision of additional ducts for future services is desirable. In every case, the Developer is advised to discuss such proposals preferably at the design stage with the relevant Statutory Undertakers, and with Cork City Council.

(f) Cover

Adequate cover must be provided in all cases, in accordance with the following requirements:-

<u>Service</u>	<u>Minimum Depth of Cover (mm)</u>	
	<u>Roadway</u>	<u>Footway</u>
Sewer (unless concrete surrounded)	1200	900
Water Mains* (Ductile Iron)	900	900
L.T. E.S.B. cable ducts	900	500
H.T. E.S.B. cable ducts	900	750
Gas Mains	900	750
Telco Ducts	900	500
Cable TV ducts	500	500
Other ducts	500	500

* Watermains layed in green areas (no traffic) can be reduced to 750mm. Maximum depth to crown of watermain is 1.2m, The laying of water mains outside this range requires written approval from the City Council Water Department

- (g) Wayleaves** Where watermain or sewer lines are laid anywhere other than in the public realm or roadway, wayleaves shall be reserved by the Developer for such pipelines when the lands are being disposed of to individual site owners, as the Local Authority will require such wayleaves to be made available, free of charge, as a prior condition before taking the services or the estate in charge.

Where the proposed works involve laying a water supply in an existing public road / place where the developer is to maintain ownership of this supply, they shall obtain permission in writing from the City Council plus specific permission of the Water Department prior to installation.

- (e) Powerlines** At this point, attention is drawn to the fact that the E.S.B. has laid down specific requirement in respect of minimum distances between high-tension power lines and structures. Developers must therefore ensure that buildings sited near overhead powerlines shall comply with the following regulations: -

- ◆ 38KV lines: Minimum distance from out offices shall be 15.0 metres. Minimum distance from residential buildings shall be 25.0 metres.

Note: These distances are measured from the nearest/highest point of the building to the nearest H.T. cable.

1.6.2 Phasing of Development

In the development of small scale estates (less than 20 houses), roads and services are to be provided in advance of house construction. In the case of large-scale development the provision of roads and services must be phased in accordance with a programme to be approved by the Planning Authority. At no stage may houses be occupied if services are not fully completed to that point. Interim inspections will be made to establish progress and compliance with standards.

1.6.3 Access

Access to the site shall be made available to Cork City Council staff for the inspection of work during construction.

1.6.3 Setting Out

Before any works are commenced the Developer or his/her contractor shall accurately set out on the ground the centre lines of all roads and sewers. All road junctions shall be accurately defined, on the site, together with the position of manholes and road gullies. The Developer or his/her contractor shall mark these lines in such a manner that they will be preserved throughout the course of the work. The Developer or his/her contractor shall establish such lines in the ground at any time during the course of the work when asked to do so by the Council's representative. All curves shall be properly and mathematically set out. The above mentioned centre lines of roads shall afterwards form the basis of establishing front boundaries.

1.7 Handover

In the case of Part 8 Developments the Developer shall maintain all elements of the public realm for a minimum period of 24 months after Practical Completion before commencing the taking in charge procedure.

1.7.1 As Constructed Drawings (to be read in conjunction with Section 3,4,5,6 & 7)

Duplicate Copies of “as constructed” drawings (scale 1:500 or as agreed with the relevant department) of the development shall be submitted as part of the “taking in charge” application. The drawings shall also be submitted in a suitable digital format e.g. in MapInfo format and Geo Referenced i.e. drawn on the basis of National Grid Co-Ordinates to the Irish Transverse Mercator Projection. The drawing shall indicate the areas of the estate to be taken in charge outlined in red , open spaces coloured in green, with all roads, footpaths and public lights clearly identified

The Part 8, or T.P and A.B.P number shall be indicated., house numbers and road names shall be included. The Developer shall provide a statement signed by suitably qualified consulting Engineer in Independent Private Practice with appropriate Professional Indemnity Insurance to Cork City Council's satisfaction that the development has been carried out in accordance with this “**Engineering Requirements for Residential Site Development Works.**”

The details of Water, Sewers, Public Lighting, Underground services & Open Spaces are to be submitted on separate drawings. The Developer shall also confirm in writing that he/she wishes to have the Estate taken in charge by Cork City Council.

The drawings shall indicate the following:

1.7.1.1 Water: Refer To Paragraph 6.20

1.7.1.2 Drainage: Refer To Paragraph 5.24-5.25

1.7.1.3 Public lighting: Refer To Paragraph 4.14

1.7.1.4 Roads / Footways / Footpaths: These shall be shown clearly on drawings with indication of type of construction and materials used including thickness of each layer. Also gradients and levels are required. All road gulleys are to be shown. The location and type of all other under and above ground services and ducts not noted above should be clearly shown. Any former paths shall also be shown.

1.7.1.5 Landscaping: Extent of landscaping shall be shown together with schedule of planting. Certification from competent landscape architect indicating that it complies with landscape conditions (if appropriate) is required.

1.7.1.6 Scale: 1:500 or as agreed with relevant dept

1.7.1.7 Levels: Metres referenced to Malin Head Datum

1.7.2 Inspections for Developers

Developers who require further inspections after the second inspection will be charged at the prevailing scale of charges as set by the Planning Department from time to time. **Prior to inspection, the Developer shall certify that the estate is in a fit state for inspection with a reasonable chance of being fit to take in charge.**

1.7.3 Boundary walls

Walls shall be certified as in compliance with IS 325: 1995 or their latest amendments.

1.7.4 Nameplates

House number(s) shall be prominently displayed. Applicant shall name roadways and provide and erect sufficient suitably positioned nameplates of a type acceptable to the Planning Authority. Nameplates to show firstly Irish name then English, postal code and cul-de-sac if relevant. Irish translations and postal code shall be obtained from the Planning Authority. Applicant shall number dwellings in a logical sequence and provide and affix in a prominent location numbers of a type acceptable to the Planning Authority.

1.8 Legal Requirements

Compliance with these recommendations shall not confer immunity on the Developer from any legal requirements and shall not remove the necessity for the Developer to comply with the requirements of the Planning Acts, the Building Regulations and Health & Safety legislation.

1.9 Adoption Procedure

Once the development has been completed to the satisfaction of the Engineering Departments of Cork City Council and subject to the Planning Department's Sanction, the Development is then referred to the Roads and Transportation Directorate who will then advertise in a Local Newspaper the Notice of Intention to take the Development in Charge under the Roads Act 1993 & Planning Act 2000. Where there is no objection from the public, the scheme is forwarded to Council for Adoption.

Section 2: Excavation and Reinstatement of Public Roads

2.1 Roadworks

No roadwork, **irrespective of duration**, may be carried out on **any road(s)** without a specific individual Direction (Licence) from the Roads Control Division of Cork City Council, indicating the period during which and the times at which the roadworks shall be carried out and any other particular requirements in respect of the said roadworks.

2.2 Notification of Proposed Roadworks

Notification must be submitted to the Roads Control Division in relation to all proposed roadworks on public roads within the jurisdiction of Cork City Council. The particular requirements in relation to notification of proposed roadworks are set out in the following sections. Further details, including copies of the relevant application forms, can be obtained from the Roads Control Division. Work may not commence until an appropriate licence has been issued by Cork City Council. All notifications must be submitted by the relevant utility/company and **not** by their agents or contractors.

2.2.1 Notification Procedure

The application procedure consists of the following forms:

- Roadworks Notification (Form T1)
- 7 Day Advance Notification (Form T2)
- Reinstatement of Recently Resurfaced Roads, Resurfacing Details (Form T2A)
- Minimum Impact Works Notification (Form T3)
- Reinstatement of Recently Resurfaced Roads, Resurfacing Details (Form T3A)
- Emergency Roadworks Notification (Form T4)
- Reinstatement Closure Notification (Form T5)

2.2.2 Roadworks Notification (Form T1)

A Roadworks Notification (Form T1) must be submitted in respect of the following categories of work:

- All single continuous excavations and reinstatements greater than 5 square metres in area.
- Works involving a number of roads.
- All works affecting bridges or sites of engineering difficulty

Cork City Council will endeavour to process a valid Roadworks Notification (Form T1) within 28 days. Having examined the application, Cork City Council, may refuse permission to proceed or issue a Roadworks Notification to the applicant, advising of the general conditions under which work can be undertaken. A Roadworks Notification does not entitle the applicant to commence work until an application (Form T2) has been approved with

specific conditions imposed. The project must commence within 3 months of the date of issue of the Roadworks Notification and must proceed on a continuous basis until completion.

2.2.3 7 Day Advance Notification (Form T2)

A 7 day advance application (Form T2) must be submitted in respect of the following categories of work:

- All works requiring a T1 application.
- Cable pulling and testing within existing ducts and chambers.

For all approved T2 applications a Licence with Associated Conditions will be issued by Cork City Council for a period not exceeding 14 days or for a specific period and time during which the works shall be carried out together with any specific applicable conditions. No works may be carried out in any public area without a current Licence. A copy of this Licence and Associated Conditions is to be retained on site and be available for inspection by a member of An Garda Síochána or an employee of Cork City Council. A separate T2 application is required for each street/ roadway affected, where works are completed in a number of separate phases or where the work duration exceeds 14 days. On commencement, work must proceed on a continuous basis until completion.

2.2.4 Reinstatement of Recently Resurfaced Roadways(Form T2A)

Where a proposed application effects, or is likely to effect, a recently resurfaced roadway Form T2A must be completed and returned in conjunction with Form T2. Cork City Council will endeavour to advise applicants of possible conflicts with recently resurfaced roadways on issue of a Roadworks Notification. Alternatively information on the extent and location of recently resurfaced roadway can be obtained from the Roads Control Division of Cork City Council. Details on Form T2A relating to resurfacing must only be completed by competent resurfacing contractors.

2.2.5 Minimum Impact Works Notification (Form T3)

A Licence Application/Minimum Impact Works Notification (Form T3) must be submitted in advance of the proposed roadworks in respect of the following categories of work.

- All single excavations less than 5m² in area with minimum impact on traffic or pedestrian flow.
- All works involving the erection/renewal/replacement/upgrading of licensed cabinet's boxes.

Cork City Council will endeavour to process a Minimum Works Notification (Form T3) within 7 working days.

For all approved T3 applications a Licence with Associated Conditions will be issued in respect of the works, a copy of which is to be retained on site and be available for inspection by members of An Garda Síochána or employees of Cork City Council. No works may be carried out in any public area without a current Licence. This Licence will specify the work to be undertaken, the date and times when works can proceed together

with any applicable conditions. On commencement, work must proceed on a continuous basis and be permanently reinstated within 3 working days.

2.2.6 Reinstatement of Recently Resurfaced Roadways (Form T3A)

Where a proposed application effects, or is likely to effect, a recently resurfaced roadway Form T3A must be completed and returned in conjunction with Form T3. Information on the extent and location of recently resurfaced roadway can be obtained from the Roads Control Division of Cork City Council. Details on Form T3A relating to resurfacing must only be completed by competent resurfacing contractors.

2.2.7 Emergency Roadworks Notification (Form T4)

Notification (Form T4) of all alleged emergency roadworks on all roads must be submitted in advance by Fax to An Garda Síochána and by fax or via ROADMAP to the Roads Control Division of Cork City Council. Emergency works are defined as works which must be expedited immediately in order to prevent or reduce injury or damage to persons or buildings. On receipt of such notification Cork City Council or An Garda Síochána may rule the works inadmissible as emergency works. The applicant is then required to make application under the normal format.

2.2.8 Reinstatement Closure Notification (Form T5)

Notification (Form T5) of all permanent reinstatements in respect of each T1 application must be submitted to the Roads Control Division immediately on completion of the works. Only one T5 Reinstatement Closure Notification will be accepted for each T1 application, irrespective of the number of intervening T2 Licences issued. The individual work number for the job should be quoted for all such notifications.

(Note a T4 application where immediate permanent reinstatement is undertaken also requires T5 – Reinstatement Closure Notification.)

2.3 Roadmap

ROADMAP is an on-line extranet roadworks control package, operated by the Roads Control Division of Cork City Council for volume applications. The system records and manages the process by which applications, as listed below, are made to Cork City Council, with on-line issue of Licences and Associated Conditions to successful applicants.

All applications and information submitted or received via ROADMAP will be taken as confirmation of acceptance, by or on behalf of the applicant, of the provisions outlined in the "Directions for the Control and Management of Roadworks in Cork City".

2.4 General Conditions - Roadworks

2.4.1 Permanent Reinstatement

The applicant is responsible for the immediate permanent reinstatement or temporary reinstatement closely followed by permanent reinstatement of carriageways, footpaths and open spaces. Reinstatement must be in accordance with the specifications outlined in

Section 6 of the “Directions for the Control and Management of Roadworks in Cork City” (Drawing numbers, 1 to 15 inclusive).

For permanent reinstatement of recently renewed road pavements, footpaths and Enhanced Surface Areas, see also 2.4.4

For carriageways in excess of 5 years old, where the trench edge is within 500mm of the kerb line, road edge, other reinstatement or ironwork, permanent reinstatement must be undertaken to that interface. For all trench openings greater than 20 metres in length, the permanent wearing course reinstatement must be machine laid. Permanent reinstatement to be undertaken immediately or no later than 1 month from the date of initial excavation. However the overriding consideration is public safety and temporary reinstatement must be properly maintained at all times.

Surface joints shall be sealed with hot bitumen and topped with fine sand /grit to get a minimum 55 skid resistance value as determined by the Portable skid Resistance Pendulum used in accordance with Road Note 27 and shall not exceed 3mm thickness and 25mm in width.

Where coloured surfaces or anti-skid surfaces are damaged they must be reinstated by the applicant as part of the permanent reinstatement. Full width reinstatement must be carried out to the specification of Cork City Council.

For footpaths in excess of 5 years old, where transverse excavations occur, permanent nearest original transverse joint. Where longitudinal cuttings occur, only one joint will be permitted, i.e. reinstatement shall be from the sawn edge to the kerb line or alternatively to the inside edge of footpath line. In all circumstances permanent reinstatement to be undertaken immediately and the reinstated surface finish must match original.

Where necessary the Roads Control Division of Cork City Council will undertake coring of reinstatements. If the cores indicate a reinstatement to be outside the specification limit, the full cost of coring and all associated fees shall be borne by the applicant.

In certain circumstances the Roads Control Division may specify that road crossings are only to be carried out by directional drilling or other similar methods.

2.4.2 Bond/Deposit

Cork City Council reserves the right to require individual operators/utilities to enter into a deposit agreement prior to undertaking any roadworks.

The amount of deposit to be paid per T1 Notification will be based on the estimated cost of permanent reinstatement as per Appendix V of the “Directions for the Control and Management of Roadworks in Cork City”, subject to a minimum deposit, see Appendix IV.

Following submission of a T5 Application, satisfactory inspection of the works and payment of all relevant invoices, 50% of the deposit amount will be released. The remaining balance of 50% will be returned on successful completion of the maintenance period.

For deposits on T3 Applications, see Appendix IV, of the “Directions for the Control and Management of Roadworks in Cork City”

Specific deposit requirements will apply to all works involving City Centre Streets with Enhanced Surfacing ,(see 2.4.4).

2.4.3 Moratoria on Roadworks on Specified Roads

Having regard for the need to minimise the disruption caused by roadworks, to protect residual amenity and to safeguard “green routes”, recently renewed road pavements and footpaths, Cork City Council will impose moratoria, of a given duration, on road openings on specified roads. For roads currently subject to moratoria (see Road Inventory via ROADMAP or contact the Roads Control Division of Cork City Council).

2.4.4 Recently Overlaid/Improved Roads and Footpaths

Where permission is granted by the Roads Control Division to excavate a reconstructed or resurfaced road pavement within 5 years of the date of being overlaid/improved, the applicant shall replace a FULL LANE WIDTH of pavement for the total length excavated. In the event of a transverse excavation, the applicant shall replace the full width of roadway for a distance of 5 metres on both sides of the excavation. Only competent surfacing contractors shall be employed, materials used and depth of reconstruction shall match the existing specification. Permanent reinstatement to be undertaken immediately or no later than 3 months from the date of initial excavation. However the overriding consideration is public safety and temporary reinstatement must be properly maintained at all times.

Where permission is granted by the Roads Control Division to excavate a reconstructed or overlaid footpath within 5 years of the date of being overlaid/improved, the applicant shall restore FULL BAY REINSTATEMENTS. The materials used and the depth of reconstruction shall match the existing specification. Permanent reinstatement to be undertaken immediately.

In the case where works affect City Centre Streets with Enhanced Surfacing, specific conditions relating to temporary and permanent reinstatement will apply together with an enhanced deposit requirement. (see Appendix VII of the “Directions for the Control and Management of Roadworks in Cork City” for locations of streets with Enhanced Surfacing.)

2.5 Defects Notification

In order to ensure compliance with a Licence, Cork City Council will inspect roadwork sites on an ongoing basis. Where roadworks do not comply with the Licence or Associated Conditions, a Defects Notification will issue.

The maintenance period shall be extended for a period up to 24 months from the date of a defects notification or the date of remedial works, whichever being the later.

Failure to undertake remedial works to the satisfaction of Cork City Council will result in forfeiture of deposit or/and an imposed charge on the utility/company, equivalent to the total cost of all remedial works and fees (see Appendix V of the “Directions for the Control and Management of Roadworks in Cork City”).

The Roads Control Division will take into consideration the number of non-compliant Defects Notifications when processing future applications.

2.6 Maintenance Period

A maintenance period of 24 months will apply to all T2 applications from the date of receipt of a valid T5 Notification.

In the case of T3 applications, a maintenance period of 24 months will apply from the date of the completion of permanent reinstatement, in accordance with Cork City Council Standards, or the receipt of payment for all associated fees and charges, whichever being the later.

In all cases any remedial work required during the maintenance period shall be carried out by the applicant to the specification of Cork City Council.

The maintenance period shall be extended:

- (a) For a period up to 24 months from the date of a Defects Notification, until satisfactory remedial works have been completed and/or
- (b) From the date of an unsatisfactory site inspection, on submission of a T5 Notification until satisfactory remedial works have been re-inspected and/or
- (c) From the last date of payment of an issued invoice until receipt of full payment.

2.7 Extension of Time

If an applicant requires an extension of time to a Licence issued by Cork City Council, he/she shall notify the Roads Control Division (Form T2) a minimum of 7 working days before expiry of original Licence. At the discretion of Cork City Council one extension of time may be granted for a defined working period.

2.8 Pre-Construction Photographs

Prior to commencement of any works, a set of colour photographs (minimum 5x7 inches) will be required every 20 metres along the line of the proposed excavation and submitted as part of the T2 Application. In the event of a T3 Application, adequate photographs to define the pre-construction layout of the works locus should be submitted. Such set of photographs shall be taken utilising a 35mm camera and prints shall be provided in albums which are catalogued and cross referenced , or alternatively in digital format as an attachment via ROADMAP. Failure to provide such prior photographic evidence will confirm to Cork City Council that all areas in its charge, affected by or adjacent to the works, are in pristine condition prior to commencement.

2.9 Indemnification of Cork City Council

Indemnification of Cork City Council is required in respect of all works, claims, proceedings, liabilities, losses or expenses of whatever nature, however arising, in connection with the activities covered by all applications. For current minimum indemnity, see Appendix IV of the "Directions for the Control and Management of Roadworks in Cork City". The period of cover shall extend from the commencement of works/activities until all areas associated with the works/activities are taken in the charge of Cork City Council.

2.10 Works Adjacent to CCMAN Broadband Network

Where an application is likely to traverse or come in contact with the CCMAN Broadband Network, the applicant shall contact E/Net at (061) 274088 or (061) 274000 in advance of excavation to confirm and locate the exact position of broadband services and connections.

2.11 Standards

Standards applicable within the jurisdiction of Cork City Council are contained in “Directions for the Control and Management of Roadworks in Cork City Council” (current edition).

The above standards are derived from “Guidelines for the Opening, Backfilling and Reinstatement of Trenches in Public Roads” (current edition).

References and terms used in the above documentation are defined in the “N.R.A. Specification for Road Works” (current edition).

In the event of conflict of specification, the matter will be referred to an independent arbitrator.

2.12 Charges

2.12.1 Application Fees

For application fees, where applicable, see Appendix IV of the “Directions for the Control and Management of Roadworks in Cork City”.

2.12.2 Long Term Damage Charges

The current Long Term Damage charges applicable to carriageways, longitudinal excavations in footpaths and open spaces are set out in Appendix III, of the “Directions for the Control and Management of Roadworks in Cork City”.

On receipt of a valid T5 Notification, Cork City Council will endeavour to undertake an inspection of the works within 2 months.

Following satisfactory on site inspection Cork City Council will again endeavour to issue an invoice for Long Term Damage and all miscellaneous charges associated with the works within 1 month.

The Applicant has a period of 3 months from date of issue of invoice to return full payment.

2.12.3 Suspension of Parking and Replacement of Road Markings

Suspension of disc parking spaces must only be carried out with the prior written consent of the Traffic Department of Cork City Council. The onus is on the applicant to ensure that the parking spaces are secured for the times during which their use is required. Current charges for the suspension of parking and replacement of road marking are set out in Appendix II, of the “Directions for the Control and Management of Roadworks in Cork City”.

2.13 Other Licensed Activities

- Form R1 Application for a Temporary Road Closure
- Form HS Licence Application to Erect, Construct, Place and Maintain a Hoarding or Scaffolding on a Public Road/Footpath.
- Form SOL Application for Skip Operators Licence
- Form SPL Licence Application to Place a Skip on a Public Road/Footpath
- Form PS Licence Application to use a Public Area for an Activity or Event
- Form MCH Licence Application to Place a Mobile Crane/Hoist on a Public Road/Footpath.
- Form SF Licence Application for the Placement of Tables and Chairs on the Public Road/Footpath.

Section 3: Roads and Footways/Footpaths

3.1 Road and Footways/Footpaths Design

The design of new streets should take into account the functions of the street, and the type, density, and character of development. Carriageway widths should be appropriate for the particular context and uses of the street. High quality, innovative layouts in accordance with the DEHLG Traffic Management Guidelines or similar documents may be acceptable; any such proposal should be discussed with Cork City Council prior to the lodgment of a planning application

3.1.1 Carriageway Width

Unless otherwise agreed by the Roads and Transportation Directorate the carriageway width shall be 7.50m except for cul-de-sac(s) where a width of 6.0m shall be acceptable and cul-de-sac(s) less than 60m long where a width of 5.5m shall be acceptable. A narrower width for short spur cul-de-sacs may be used subject to agreement. **The above applies to all areas for adoption by Local Authority (Cork City Council).**

3.1.2 Off-Carriageway Parking

Parking shall be provided in accordance with the current City Development Plan.

3.1.3 Drive-ins

For safety reasons drive-ins shall have:

- (1) Vehicular entrances not wider than 3.0 metres (unless otherwise agreed with the Roads & Transportation and Planning Directorates
- (2) Hardstanding parking spaces of 2.5 metres x 5.0 metres minimum.
- (3) Gates not capable of being opened outwards **or** outward opening gates shall be recessed **or** no gates shall be provided.
- (4) Gradients of driveways shall not exceed 1:10 (10%).

Surface water from drive-in must not be allowed to discharge across the vehicular entrance to the carriageway and must be dealt with on site.

3.1.4 Junctions

All junctions internal to the estate shall be T-Junctions. The stagger of these junctions and the layout of junctions with other roads shall be subject to approval.

3.1.5 Junction Sightlines

The area of unobstructed sight distance required at a junction is termed the "clear sight-triangle" and is measured from a driver eye height of 1.05m to an object height of 1.15m. The clear sight triangle is illustrated in Figure 2.1.

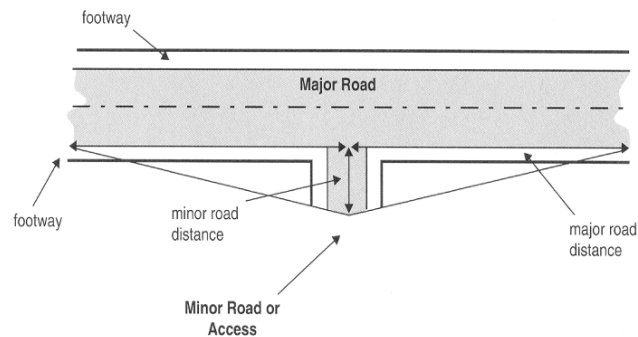


FIGURE 2.1: CLEAR SIGHT-TRIANGLE

The minimum dimensions of the clear sight-triangle for roads of various design speeds are given in Table 3. 1, with the major road design speed determining the required dimensions.

TABLE 3.1

Junction sightline requirements

Design speed (km/h)	40	60	80	120
Major Road distance (m)	80	120	170	230
Minor Road distance (m)	4.5	4.5	4.5	4.5

3.1.6 Junction Radii

Junction radii shall be designed to allow vehicular traffic and pedestrians negotiate junctions safely. This can be done using a swept path analysis taking into account the types and volumes of all road users, particularly pedestrians and cyclists. Smaller kerb radii are favoured where there are large volumes of pedestrian traffic because vehicles are forced to slow down when turning. The following general guidance on junction radii should be followed:

1. The kerb radii between an estate road and a road not covered by these recommendations shall be a minimum of 10.5m
2. The kerb radii to junctions of roads to which these recommendations apply shall be a minimum of 6m.
3. The kerb radii between local collector roads and access roads should be no greater than 4 m.

The descriptions of the urban road classifications used above are contained in Section 1.6 of the Traffic Management Guidelines.

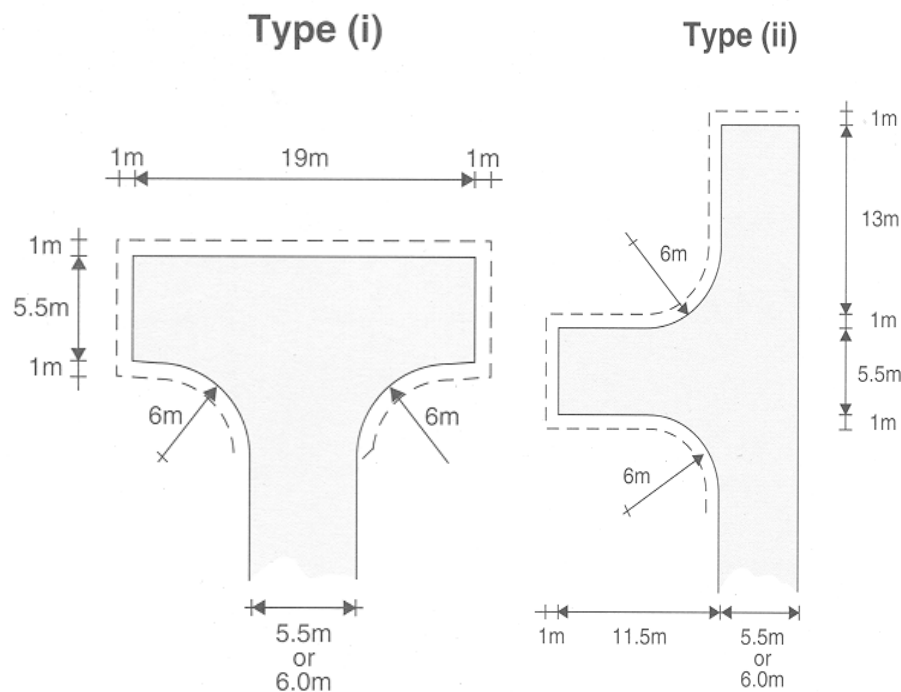
3.1.7 Cul-de-Sacs

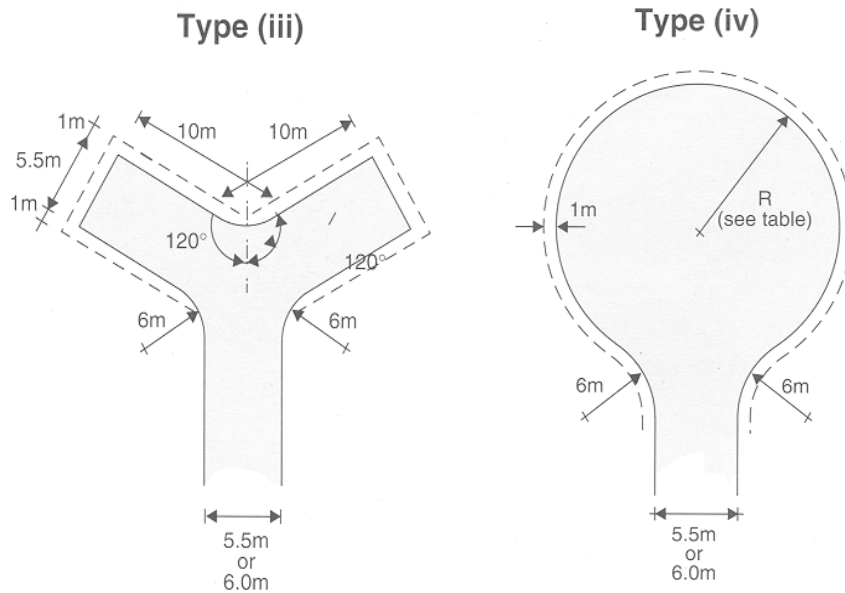
Turning bays should be provided at the ends of cul-de-sacs. The dimensions required for turning bays in residential cul-de-sacs depend both on the maximum size of vehicle to be accommodated and on the frequency with which the turning bay would be used by that vehicle.

Figure 2.2 of “Recommendations for Site Development Works for Housing Areas” published by D.O.E. illustrates suitable turning bays for the end of cul-de-sacs. The types (i), (ii) and (iii) shown on the figure, should enable most large refuse vehicles, or fire engines, to turn by means of a three point turn. Other types of turning bay may well be acceptable. Smaller dimensions would suffice for types (i), (ii) and (iii), where it is intended that only private cars should use the turning bay. Type (iv) permits turning, without reversing, for the indicated vehicle types.

Developers should determine the local authority requirements with respect to turning capability, before finalising cul-de-sac layout.

TURNING – AREAS AT CUL-DE-SAC ENDS





3.1.8 Horizontal Road Curves / Junctions

Roads shall be designed and located to intersect at angles of between 70 and 110 degrees and preferably at 90 degrees. Where one road crosses or meets another at an angle outside this range, suitable curves should be introduced in the alignment of the minor road, subject to approval, in order to improve the angle of intersection. Minimum radii of horizontal road curves shall be 120m

The horizontal road alignment should be designed to minimize excessive traffic speeds and to enhance the safety of vulnerable road users in particular. It is recommended that the measures in Chapter 7 of the Traffic Management Guidelines be used when designing the horizontal road alignment.

3.1.9 Road Gradient

Longitudinal gradients shall normally lie between 1/200 (0.5%) and 1/20 (5%) In exceptional circumstances such, as hilly regions, a maximum 1/12 may be acceptable subject to approval.

At junctions, the gradient of the side road shall not be greater than 1/50 (2%) for a distance of 7.0m measured along the centre line of the side road from the continuation of the nearer edge of the major road carriageway.

3.1.10 Carriageway Crossfall

A crossfall of 2.5% should be provided for a normal machine laid surface. This may be decreased to 2% for a high quality surface finish, or may be increased to 3% for hand laid surfaces.

3.1.11 Services

Services should be laid underground, adjacent to the roadway. The laying of services in other locations is subject to approval.

The public area, including the footway (if any) beside the roadway, should be of sufficient width to accommodate the services required. Services should only be laid under the roadway where there is a requirement to cross the roadway. In such cases, services should be laid at right angles to the roadway.

3.1.12 Clearance

The normal minimum lateral clearance of fixed objects from the roadway edge should be 450mm. This applies to items such as public lighting columns, posts, trees and piers at entrances to developments. Particular circumstances may require that this clearance be reduced, subject to approval. In no circumstance should this clearance be less than 225mm. The minimum unobstructed width of footway shall never be less than 1.2m.

3.1.13 Footway Widths

Footways should be provided on both sides of each road. In general, they shall be 2 m wide. Narrower footways can be used in certain locations, subject to an absolute minimum of 1.2 m and City Council approval.

3.1.14 Footway Crossfalls

Footways should be constructed with a 2 - 3% crossfall. In **all** circumstances, this crossfall should result in surface water falling on the footway draining towards the nearest carriageway edge.

The dishing of the footpath shall be carried out over the full width (except where the back of the footways is required to be kept high for drainage purposes) so that the minimum cross-fall of 1 in 36 is maintained at the vehicular entrance.

3.1.15 Pedestrian Crossings

The road layout design should incorporate sufficient pedestrian crossings. All pedestrian crossings should be designed and constructed to comply with "Guidance on the use of Tactile Paving Surfaces" by the UK Department of the Environment Transport and the Regions. Pedestrian crossings on new footpaths should have crossfalls of 2-3%, falling towards the carriageway edge.

At controlled crossings the pedestrian is able to establish priority over vehicular traffic. The red blister (tactile) should be used at controlled crossings only.

At uncontrolled crossings the pedestrian does not have priority over vehicular traffic and must make a decision about whether it is safe to cross. The blister surfaces should be buff or any other colour (other than red) which provides a contrast with the surrounding footway surface.

3.2 Roads and Footways/Footpaths Construction.

3.2.1 General

Road works shall comply with the requirements of "Specification for Road Works" published by the National Roads Authority.

3.2.2 Carriageway Construction

The carriageway construction comprises the pavement layers on the pavement foundation. The pavement layers should be constructed using flexible materials. Block paving, or in situ concrete should not be used in the pavement layers without the written permission of the Roads & Transportation Directorate of Cork City Council.

The pavement structure should comprise the following layers:

- the wearing course (Surface Course) on
- the base course on (Binder Course) on
- the road base on
- the sub-base on
- the capping layer on
- the natural sub grade soil.

No capping layer is required where the California Bearing Ratio value of the sub grade is greater than 15%.

3.2.3 Carriageway Sub-grade Strength

Sub grade strength should be established by means of the California Bearing Ratio (CBR) Test, in accordance with BS 1377: Part 4: Section 7. Samples should be taken at the rate of one per 100m of road and where significant variations in soil type are anticipated. Extra samples may be required by the Local Authority where the difference in strength between two adjacent samples indicates a significant variation in soil type. In preparing the test specimen, the method of compaction should be the Static Compaction Method 2, as specified in paragraph 7.2.3.3 of BS 1377: Part 4.

The moisture content and density conditions used in the test should reproduce, as closely as possible, the conditions likely to apply under the road after construction. To estimate the appropriate density condition, a preliminary test may be carried out using the vibrating hammer method of compaction given in BS 1377: Part 4: Section 3, but with the soil at the expected average moisture content after construction. The CBR specimen should then be compacted to a density corresponding with 95% of the value obtained in the preliminary test.

In establishing sub grade strength, due account should be taken of the likely impact of the construction phase on the characteristics of the sub grade material. This may be critical, particularly on a site with a relatively high water table or poor drainage parameters. In such cases, the in-service long term strength of the sub grade may be considerably less than that of the same soil in an undisturbed condition.

For sub grades with a CBR of less than 2%, a geotextile separator should be used and specialist advice should be sought regarding minimum thicknesses.

3.2.4 Depth of Carriageway Sub Base and Capping Layer

The depth of the sub-base and capping layers will vary with the sub grade strength, as indicated by the CBR test results.

The thickness of the sub-base layer should be 150mm for all forms of roadway construction.

The thickness of the capping layer will vary with the CBR value, as indicated in Table 3.2. As can be seen from the table, if the CBR value of the sub grade exceeds 15%, no capping layer is required.

TABLE3.2 Capping Layer - Minimum Construction Thicknesses

Lowest CBR of Sub grade	Minimum capping layer thickness (mm)
*Less than 2	(See footnote)
2-15	300
5-15	150
More than 15	no capping layer required

- For sub grades with a CBR of less than 2%, a geotextile separator should be used and specialist advice sought regarding minimum thicknesses.

Where local weak areas of sub grade strength exist, increased construction thicknesses, as approved, should be provided.

Where the Contractor proposes to use the sub-base for construction plant and traffic, it may be necessary to strengthen the sub-base (and capping layer, if any), in order to accommodate the method of construction and the type of plant and traffic proposed. It might well be, that the loading conditions during the construction phase could be more onerous than those experienced when the pavement is in full service. The thickness of sub-base (or capping layer and sub-base) required in such cases, would be dependent on the CBR of the sub grade and the construction traffic, as measured in Standard Axles. The Contractor's proposals in this regard are subject to approval. Any permanent thickening required should be across the entire width of the foundation, unless otherwise approved. Temporary thickening should not impede drainage of the sub-base or sub grade.

Damage caused by construction traffic should be remedied, to meet specifications, before construction of the pavement layers.

3.2.5 Carriageway Capping Layer

The capping layer shall be constructed with Class 6F1 or Class 6F2 material in accordance with the NRA Specification for Roadworks. The capping layer should comply with Cl. 613 of this NRA specification.

3.2.6 Carriageway Sub Base Material

Sub base material should comprise Granular Material Type B in accordance with Clause 804 of the NRA Specification for Roadworks. The sub base should be constructed to comply with Clause 801 and 802 of the NRA Specification for Roadworks.

3.2.7 Carriageway Roadbase

Carriageway roadbase material should be 150mm thick and it shall normally comprise one of the following:

a) Cement Bound Material, Category 4

This material should comply with Clauses 1035 to 1042 of the NRA Specification for Roadworks.

b) Wet Mix Macadam

Wet mix macadam should comply with Clause 806 of the NRA Specification for Roadworks. It should also be laid and compacted in accordance with this Clause.

c) Dense Bitumen Macadam

Dense bitumen macadam shall comply with Clause 901 and Clause 903 of the NRA Specification for Roadworks.

3.2.8 Carriageway Basecourse (Binder Course)

The basecourse should have a compacted thickness of 60mm and be constructed of Heavy Duty Bitumen Macadam Basecourse material. It shall have an aggregate of nominal size 20mm and comply with Clause 933 of the NRA Specification for Roadworks. The basecourse should be constructed to comply with Clause 901 of the NRA Specification for Roadworks.

3.2.9 Carriageway Wearing Course (Surface Course)

The wearing course shall have a compacted thickness of 40mm and be constructed of stone mastic asphalt or dense wearing course macadam. It shall have an aggregate of nominal size 14mm and comply with Clause 901 of the NRA Specification for Roadworks. Stone mastic asphalt shall comply with NRA requirements.

3.2.10 Footways and Paved Areas - General

Footways and paved areas shall be in accordance with the "Specification for Road Works" - Volume 1 of the "Manual of Contract Documents for Road Works" published by the National Roads Authority in March 2000.

Unless otherwise agreed with the Roads and Transportation Directorate, footways should be constructed of in situ concrete surfacing laid on a sub-base.

The crossfall of all footways, unless otherwise directed or described in the Contract, shall be 1 in 40.

The standard kerb height over the finished carriageway surface shall be between 150mm and 175mm, except where vehicle access is to be provided and at pedestrian crossings. The kerb height where vehicle access is provided shall be 25mm.

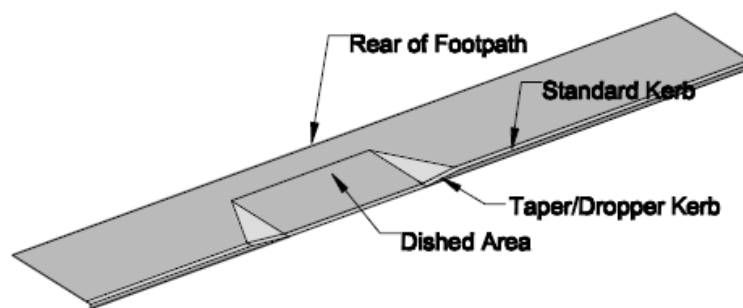
At pedestrian crossings with tactile paving, the kerb shall be level with the adjacent carriageway.

Lengths of footway with two different kerb heights can be joined by transition sections of footway with varying kerb heights. The longitudinal gradient of these transition sections shall not be greater than 8%.

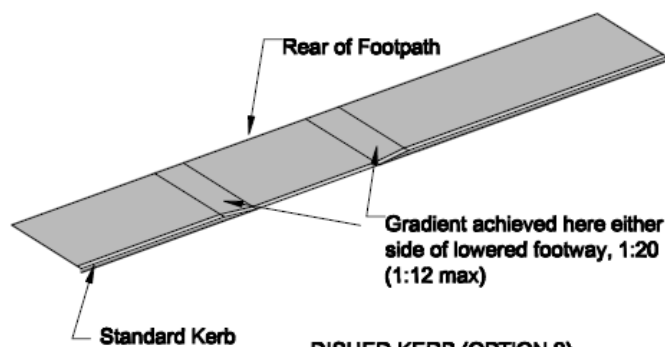
Tactile paving shall comply with '*Guidance on the Use of Tactile Paving Surfaces*', published by the Scottish Office and U.K. Department of the Environment, Transport & the Regions.

Tactile concrete flags shall be Type "F 65", 400mm x 400mm x 50mm in locations as indicated.

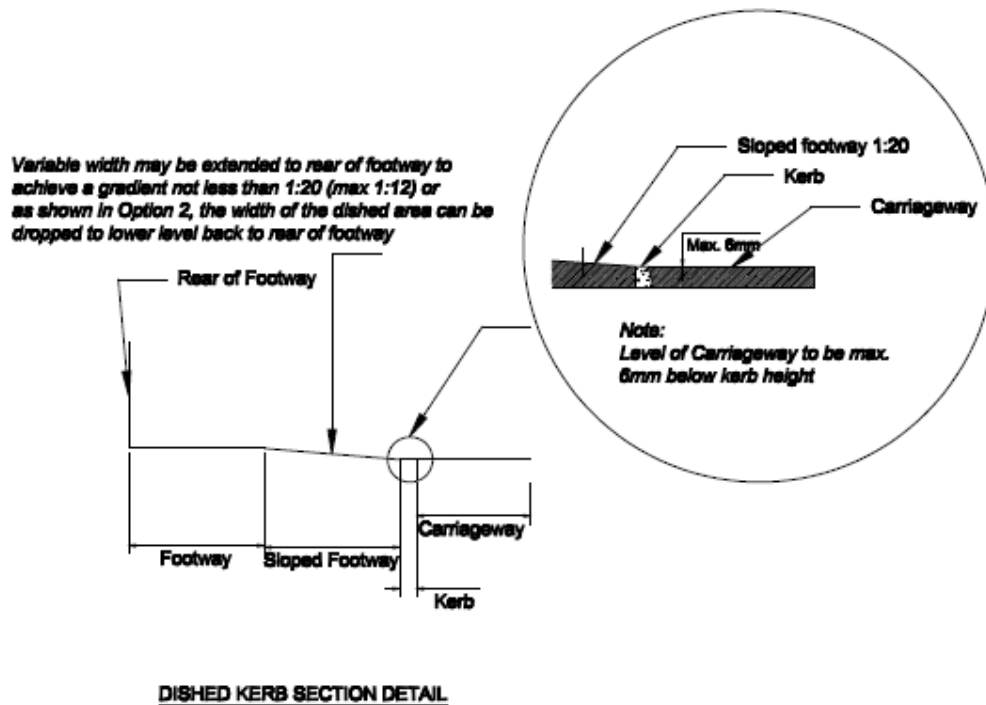
Bollards and railings shall be installed as directed, be of an approved type and set in approved retention sockets.



DISHED KERB (OPTION 1)



DISHED KERB (OPTION 2)



3.2.10.1 In Situ Concrete Footway Construction: In-situ concrete footways shall, unless otherwise directed, be 150 mm thick except in the case of vehicular entrances or driveways where the thickness shall be 225mm, reinforced with A142 steel mesh if directed.

The footways shall be constructed of concrete Grade C30 laid in a single layer on the compacted granular sub-base of Clause 803 or 804 material, 100mm thick.

Where in-situ concrete is cast as a kerb to form part of a cast in-situ concrete footway, it shall be scribed with a line parallel to the face at a distance of 100 mm from the face and the 100mm width shall be steel floated. The finished vertical kerb surface shall be formed with a shutter to ensure a neat clean face free from surface defects, fins, discolouration, honey-combing etc. The kerblines shall be accurately formed to the line of the carriageway and free from undulations and waves. The kerb edge between the vertical and horizontal surfaces shall be bullnosed with a 20mm radius.

Footways should be finished neatly around stopcock features and chamber covers, all of which shall be firmly and securely bedded on their chambers and set carefully in proper position to the finished surface level of the footpath. No stopcock chamber or any other chamber cover is permitted within 400mm of the footway kerblines.

The edge of in situ concrete footways adjacent to the carriageway edge shall be strengthened by forming a thickened band of concrete, 300mm wide by 100mm deep (250mm total depth). The underside of concrete at the road edge shall be a minimum of 75mm below finished road level.

In situ concrete kerbs can only be used on the written permission of the Roads and Transportation Directorate. In situ kerbs shall comply with 1103 of the NRA Specification for Roadworks.

3.2.10.2 Footway Expansion Joints: Spacing of expansion joints shall be 6.0m and should be formed in a **straight line, at right angles** to the footway.

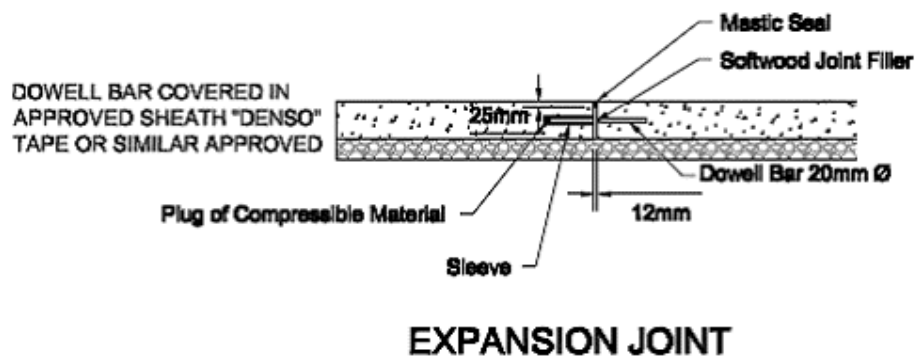
The joint shall be flush with the concrete surface.

Contraction joints should be placed in the middle of the bay i.e. at 3.0m in the centre of a 6.0m bay

Joint shall be fully cut through thickness of concrete slab and be 12mm minimum width.

Expansion joints shall be formed to 25mm from top with "Flexcell", Softwood softboard or strips of approved hession-based damp proof coursing or unsanded self finished bitumen roofing felt of equivalent quality, and remainder filled with plastic or similar suitable bituminous joint sealer.

Contraction joints shall be minimum width 10mm at max, spacing of twice times footway width i.e. 4.0m maximum spacing for 2.0m wide footway. Joint shall be cut to 1/3 depth of concrete slab and filled with plastic or similar suitable material.



3.2.10.3 Footways and Paved Areas (Precast Concrete Flags) (only to be used with specific approval)

Precast concrete flags shall be laid in accordance with BS 7533 : Part 4 : 1998.

The flag sizes and patterns shall be subject to approval but generally a form of stretcher bond.

Flags shall be laid on a 10mm-40mm thick bed of 4:1 semi-dry sand:cement mortar with 0.9 kg per m³ of polypropylene fibres. The sand shall comply with Type M or F Table 8 of IS 5, Part 1. Any mortar which has been mixed for more than two hours should be discarded unless a suitable retarder has been added.

The mortar shall be applied to a 100 mm thick 30N concrete base.

The flags shall be laid on the mortar bed true to line and level using a paviour's maul. The Contractor shall check that the flags do not rock after bedding down, lifting and re-bedding any as necessary. Any unit deviating more than 3 mm in 1 m from level shall be made

good by lifting and relaying. Notwithstanding the above, the difference in level between any two adjoining flags at the joints shall not exceed 3 mm.

The joints shall be evenly spaced 3 mm nominal width (maximum 5 mm) and shall be thoroughly grouted and finished flush with 3 : 1 sand : cement mortar (sand Type F, Table 8, IS 5, Part 1). Brush in mortar and top up joints several times after the initial filling as required.

3.2.10.4 Precast Kerbs.: All carriageway edges shall show between 150mm and 175 mm above the channel.

The preferred kerb height at vehicular entrances shall be 30mm. (25mm<kerb height>40mm)

At pedestrian crossings a kerb height of 10 mm should be provided.

The footway slope at such dished kerbs should not normally exceed 7%.

Where cast in-situ concrete composite kerb/footway is proposed, the footway concrete thickness shall be deepened to ensure that the underside of concrete is at least 75mm below finished road level across a width of 150mm from kerb-face.

Alternative kerb types at roadway edges shall be subject to approval.

The recommended surface regularity of the surface course are:

- Design Alignment = 12mm
- Difference in levels at the joints of adjacent kerb units = 3mm

Where precast kerbs are used they shall be 250mm by 125mm complying with I.S. 146 and shall be laid on a 100mm thick by 300mm wide concrete bed and haunch.

When laying precast kerbs a foundation of ST1 (Lean mix) should be deposited along the line of units. The units are laid directly on fresh mixed concrete and set to line and level.

The concrete should extend to a width to fully support the units and the backing concrete to haunch the units. It should have a minimum depth after placing the unit of:

Edging units	75mm
Small kerb units	100mm
Kerb and channels	150mm

In areas subject to heavy loading dowel bars should be firmly fixed in the kerb face and extended into the backing haunching to strengthen the haunch against horizontal displacement.

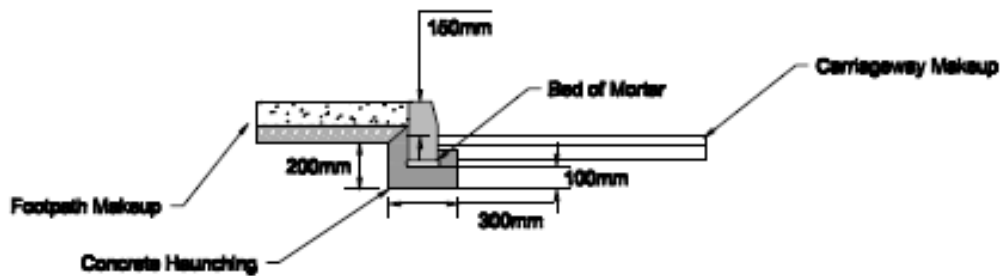
Dowel bars may be omitted if the backing is adequately restrained by adjacent material.

When units are laid over or adjacent to a concrete pavement which includes movement joints, they should continue throughout the kerb race, kerb and haunching

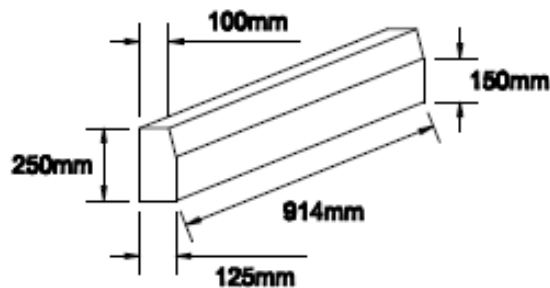
Joint filling between kerbs is generally unnecessary. The kerbs must not be butt jointed. The minimum gap between kerb units should be 2mm.

Mortar joints are not necessary but can be used for aesthetic reasons. Where mortar joints are used, they should be completely filled and fully compacted. Joint widths should be 5-7mm.

For curves of radius 15m or less, kerbs of appropriate radius shall be used as per I.S. 146



SECTION THROUGH STANDARD KERB



DETAIL OF STANDARD KERB

3.2.11 Road Drainage Layout

Road drainage should be provided using road gullies connected by 150mm pipes to the storm drainage system.

Road gullies should be located so that the maximum impervious paved area draining to each one is not greater than 200m². In no case should the spacing between adjacent gullies exceed 40m.

Two road gullies adjacent to each other should be provided at all sag points and at any location where the absence of a gully would result in surface water ponding. Both gullies should be connected to the trunk sewer by separate 150mm diameter pipes.

3.2.12 Road Drainage Pipes and Manholes

Road drainage pipes and manholes should be constructed in accordance with Section 5 of this document.

3.2.13 Road Gullies

Materials:-

- (a) Gratings and frame shall be ductile iron and shall comply with EN124 D400.
- (b) Gully gratings shall have a minimum clear waterway area of 740 cm².

- (c) Gratings and frames shall be locked with an M16 stainless steel locking bolt and nut. Provision shall be made to allow for the replacement of the bolt and nut in the event of damage. Tapping of frame to lock will not be permitted.
- (d) Frames shall be 3-sided to enable grating to be as near as possible to the kerb.
- (e) Hinges shall be located so that grating is never open directly against direction of traffic.
- (f) The minimum grating frame depth shall be 100mm.
- (g) The minimum clear opening dimensions shall be 360mm X 310mm.
- (h) Gratings shall incorporate a raised non-slip pattern.
- (i) Gratings shall be hinged, coated black and rust free.
- (j) Road gullies shall be trapped so that the water seal depth is not less than 50mm.
- (k) Chambers shall have minimum internal dimensions of 360mm x 300mm x 370 deep (excluding grating and frame) complete with nominal 150mm internal diameter trapped outlet and rodding eye.

Installation:-

- (a) Gully grating frames shall be bedded on 10-20mm mortar complying with Clause 507.14 of the NRA Specification for Roadworks.
- (b) Grating level shall be 5 – 10 mm below the finished ground level.
- (c) The backfill around gullies shall comply with Clause 508.6 of the NRA Specification for Roadworks. Chambers shall be bedded on and surrounded by 150mm thick 20N concrete.

3.2.14 Manhole Covers and Frames

Manhole covers and frames shall comply with EN124 D400. The minimum opening dimensions shall be 600 mm x 600 rectangular or, if circular 600 diameter. Prior approval of the type being used will be necessary.

Covers and frames installed in roads and paths and any areas that are likely to be subject to vehicular traffic shall be ductile iron to class EN124 D400, Noroc or similar approved. Overall dimensions 760 x 760 x 100mm. Frames shall have a 600 x 600mm opening. Cover shall consist of wedged seating for non-rock performance. A third party test report showing compliance with the full requirements of EN124 must be provided.

High strength engineering brick or in situ concrete may be used to make up the manhole walls directly under the frame. Standard concrete blocks or bricks will **not** be allowed. The engineering bricks shall comply to the BS EN 771-1:2003 Mortar shall have 1:3 cement sand dry volume ratio. The sand shall comply with BS EN 13139:2002.

Manhole frames shall be bedded and surrounded in accordance with manufacturer's recommendations.

Mortar shall have 1:3 cement sand dry volume ratio. The sand shall comply with BS EN 13139:2002

3.2.15 Bollard

Permanent bollards shall be of minimum height 930mm with a galvanised steel centre post, fitted into a 76mm diameter retention socket. Outer sheath shall be cast aluminium or cast iron construction with black polyester powder coated finish and shall contain the Cork City Council crest if required. A 3M diamond grade white reflective tape band shall be located near the top of the bollard."

3.3 Traffic Signals and Associated Infrastructure

3.3.1 Traffic Installation cable and ducts

All electrical and communications cables for traffic light systems, speed control measures and traffic calming shall be manufactured to the relevant current standards and shall have the outer sheath in orange colour, this being the standard for traffic installations.

Orange coloured twinwall duct to IS370:2007, with smooth interior wall, polythene ducting shall be installed to cater for traffic installations. Cork City Council may direct that red 100 mm smooth wall duct (as per Public Lighting requirements) be installed in tandem with traffic ducts.

3.3.2 Traffic Light Systems, Speed Control Measures & Traffic Calming

The provision of traffic signal control, speed control measures & traffic calming shall be undertaken with reference to the latest versions of the *Traffic Management Guideline*, [DTO & DoT] and *Provision of Cycle Facilities - National Manual for Urban Areas* [DTO] while the specification shall comply with the *Traffic Signs Manual*, [DoT] to meet requirements for approval by the Roads & Transportation Directorate, Cork City Council.

The developer shall submit for approval by Cork City Council the proposed traffic control, speed control measures and traffic calming proposals. The Council shall direct what (if any) alterations are required to the proposed design. Cork City Council reserve the right to ensure that safe, compliant and functional traffic management systems are installed by developers.

3.3.3 Small Civil Works – Access Chambers & Ducts

Service ducts shall be constructed using a polypropylene twin walled orange coloured to IS370:2007 integrated duct system.

Electrical supply ducts between the ESB Networks mini-pillar and the micro-pillar, customer's service pillar or the metered supply cabinet shall be a polypropylene twin walled red coloured integrated duct system.

Decorative Inspection Chamber: All access chamber covers on the footpath to cater for a change of direction shall be ductile iron as per Cavanagh Celtic or similar approved with frame opening 600mm x 600mm to EN 124 B125 with M16 stainless steel locking bolt or similar approved. Lock shall make provision for nut and bolt if damaged. Tapping of the frame is not permitted. If similar approved it shall be certified by an accredited Third party

Large Inspection Chamber: All access chambers on the footpath to cater for a change of direction shall be ductile iron with galvanized steel frame as per Cavanagh Antelope JB5 or similar approved with frame opening 615mm x 615 mm to EN 124 B125 marked "Traffic" with M16 stainless steel locking bolt, or similar approved. Lock shall make provision for

replacement of bolt and nut if damaged. Tapping of frames is not permitted. Cover & frame shall be certified by an accredited Third party.

Medium Inspection Chamber: Access chambers on the footpath for straight through services shall be ductile iron with galvanized steel frame as per Cavanagh Viper Traffic JB2 or similar approved with frame opening 720mm x 260 mm to EN 124 B125 marked "Traffic" with M16 stainless steel locking bolt or similar approved. Lock shall make provision for replacement of bolt and nut if damaged. Tapping of frames is not permitted. Cover and frame shall be certified by an accredited Third party.

Small Inspection Chamber: Access chambers on the footpath for straight through services shall be ductile iron with galvanized steel frame as per Cavanagh Viper Traffic JB1 or similar approved with frame opening 385mm x 260 mm to EN 124 B125 marked "Traffic" with M16 stainless steel locking bolt or similar approved. Lock shall make provision for the replacement of bolt and nut if damaged. Tapping of frames is not permitted. Cover and frame shall be certified by an accredited Third party.

Carriageway Access: See Section 3.2 of this document

The IPL RS115 Retention Unit with + Pole-box or similar approved shall be used for all traffic signal pole installations as manufactured by Innovative Products Ltd. (IPL) or similar approved.

The installation of Service Ducts shall cater for the installation of electric cable to all the traffic signal poles at each junction and cater for the provision of the ESB power supply cable for each controller.

The ducts shall be linked through to each pole in turn via pole-boxes and interconnecting chambers as against providing radial connections to the controller position.

In the case of restricted ground conditions, IPL offer another version of the retention socket, being the RS 115 Duck-foot unit which allows the use of a remote access chamber and accepts a 110mm duct directly will be considered in extreme circumstances.

Each of the pole installations must be constructed with the complete and proper pole-box arrangement prior to any installation of poles or electrical work.

The service ducting installation shall be pulled through with a correctly sized brush and mandrill with ducts roped to chambers for the complete scheme. The civil works will not be taken-in-charge until such time as the access chambers, ducts and pole installation can be deemed to be completed to satisfaction of Cork City Council.

Section 4: Public Lighting

4.1. Introduction

Cork City Council is seeking to foster an improvement in the design and provision of high quality street lighting throughout the urban and sub-urban area in Cork. It is essential that all public lighting schemes comply with the current CEN Code of Practice (2003 issue at time of this revision).

In particular, Cork City Council wishes to promote the installation of energy efficient public lighting schemes. Measures required to achieve this include the use of lanterns with modern optics which would minimize light pollution, optimization of scheme layout, use of modern energy efficient lamps and control gear, complying with best practice and taking account of the 'Campaign for Dark Skies' issues where appropriate. Therefore all lighting schemes shall incorporate the requirements of, "Guidance notes for the Reduction of Light Pollution" issued by the Institution of Lighting Engineers and available as a download from its website www.ile.org.uk.

Cork City Council is seeking to ensure that lighting equipment is selected from the higher quality grade, as against the standard range, of equipment available from various exterior lighting or street lighting manufacturers to enhance the streetscape, ensure longevity and provide an energy efficient lighting scheme.

Street Lighting design has to be undertaken to meet the requirements of the new CEN code of practice EN 13201: 2003 and BS5489: 2003. Furthermore, ESB Networks (DSO) requirements for supply shall be undertaken with reference to conditions being established by the Commission for Energy Regulation, CER in Ireland.

The lighting design for all new schemes and modifications to existing developments must cater for the need to up-grade lighting on existing junctions, entrances and access roads in addition to any lighting being provided for the development.

Where suitable, low brightness energy efficient lighting schemes should be considered with a view to enhancing the nighttime scene and improved security with attractive modern street furniture. Cork City Council, Traffic Division shall be consulted at the design stage in this regard.

The installation of schemes in Residential Areas shall comply with the Code of Practice for Public Lighting ET211: 2003, the National for Electrical Installations (ET 101: 2008) current at time of issue and shall include the provision of a Customer Service Pillar(s) in line with the requirements of ESB Networks National Code Of Practice For Customer Interface (current edition).

All queries pertaining to the design of public lighting installations in Cork City should be directed to Cork City Council, Traffic Division.

4.2 General Technical Specification / Luminaires

Cork City Council requires that the following general specifications be followed in the design and installation of public lighting schemes in the city.

- Luminaires shall comply with I.S. EN 60598-2-3.
- The lighting scheme shall incorporate SON sources and where approved by Cork City Council, 'white light sources' for the lanterns selected, e.g. Metal Halide Sources. Cork City Council no longer accept SOX sources in new public lighting Schemes;
- Cork City Council will consider the use of LED sources where technically and economically feasible;
- All luminaires shall incorporate electronic ballast control gear(* see note) as manufactured by SELC Ireland or approved similar and shall incorporate SELC solar cell switches as standard. Decorative or period style lanterns shall incorporate SELC sub-miniature solar cell switches;
- All luminaires shall be sealed to the appropriate rating and shall incorporate ingress protection to a minimum of IP65 for the lamp enclosure;
- All luminaires shall have a polycarbonate or toughened safety-glass lens / shallow bowl or approved similar. In any event the proposed luminaire shall have a minimum impact resistance rating of IK08 or greater as defined by EN 50102. This is to ensure a suitable level of robustness of the lens / bowl to vandalism. Most good quality luminaires meet this requirement, however Cork City Council reserve the right to receive confirmation of this from the manufacturer at the Public Lighting Scheme design review stage;
- Cork City Council require engineering best practice to be applied in the public lighting design of residential and commercial developments. This includes a requirement that public lighting schemes should be designed from junctions and traffic (both Pedestrian and Vehicular) conflict areas back. E.g. T-junctions, pedestrian crossings etc. The illuminance / luminance at conflict areas should be of the average level or greater than that specified in BS5489 and EN13201 for the particular design objective rather than the minimum;
- A maintenance factor based on a cleaning cycle of four years shall be incorporated into the design. In the event that this information is not available from the lamp and / or luminaire manufacturer(s) a maintenance factor of not more than 0.8 shall be applied to all public lighting scheme designs utilising SON sources. Cork City Council may require a different maintenance factor to be applied in areas of high pollution, vandalism etc. This shall be advised at the design review stage;
- Steps should be illuminated from the bottom up to highlight the step edges, e.g. the lighting column should be erected at the bottom of the steps where possible and practicable. In some cases it may also be necessary to erect columns along the length of the steps;

- Cork City Council aims to keep the number of diverse luminaire models within reasonable limits in its inventory. This is to allow economies of scale to be achieved in the maintenance (replacement, spares etc.) of its public lighting assets. Cork City Council, Traffic Division recommend the use of the following luminaires in new and / or upgrades of public lighting schemes. Cork City Council already has significant numbers of the following good quality luminaires in its inventory. Use of other luminaires (including others supplied by listed suppliers), whilst not prohibited, requires the explicit permission of Cork City Council:

- 70 / 100 Watt SON Source Luminaires

DW Windsor AKORD Cone;
Philips Selenium;
Siteco SQ 50 / SQ 100;
Urbis Sapphire 2.

- 100 / 150 Watt SON Source Luminaires

DW Windsor EVORA (where a more decorative fitting is suitable);
Philips Selenium;
NERI Heron (predominantly city centre only);
Siteco SQ 100 / SQ 200;
Urbis Sapphire 2 / 3.

- 250 Watt SON Source Luminaires

NERI Heron;
Siteco SQ 200;
Urbis Sapphire 3.

*Note. 250 Watt luminaires are generally only used where the use of 150 Watt fittings result in a greater overall scheme total wattage.

Cork City Council shall also consider luminaires produced by other suppliers / manufacturers provided that the proposed lantern meets the minimum technical requirements as set out in this document, with a demonstrated regard for thermal management of heat for electronic ballast and as reliable as those recommended and being economically feasible to maintain.

Note: All luminaires being used on the proposed scheme shall incorporate electronic ballast control gear in all lanterns up to 150W. This well established lighting control technology as manufactured by SELC Ireland amongst others specifically for street lighting use. Electronic ballast control ensures greater efficiency, Energy Saving and enhanced lamp lifetimes with consistent performance. Cork City Council, Traffic Division are aware of a number of instances where Luminaire suppliers are only in a position to supply proprietary electronic control gear. In this regard Council approval shall be obtained at the design review stage.

4.3. Public Lighting Columns and Brackets

Tapered tubular or tapered hexagonal / Octagonal galvanised lighting columns shall be selected for use on new schemes and all columns shall be galvanized on both the inside and outside to BS EN ISO 1461: 1999. Public lighting columns shall be designed to the BS-EN 40 family of standards, Viz.:

(a)	IS EN 40-1:1992	Lighting Columns. Definitions and terms.
(b)	IS EN 40-2:2004	Lighting Columns. General requirements and dimensions.
(c)	IS EN 40-3-1:2000	Lighting Columns. Design and verification. Specification for characteristic loads.
(d)	IS EN 40-3-3:2003	Lighting Columns. Design and verification. Verification by calculation.
(e)	IS EN 40-3-2:2000	Lighting Columns. Design and verification. Verification by testing.
(f)	IS EN 40-5:2002	Lighting Columns. Requirements for steel lighting columns.
(g)	BS PD 6547:2004	Guidance on the use of BS EN 40-3-1 and BS EN 40-3-3
(h)	IS EN 1991-1-4:2005	Eurocode 1: Part 1.4. Basis of design and actions on structures. Actions on structures. Wind actions.
(i)	BD 94/07	DMRB Vol.2 Highway Structures Design (Substructures and Special Structures), Materials. Section 2 Special Structures Part 1 BD 94/07 Design of Minor Structures (Formerly BD 26/99 & 26/04)
(j)	NRA BD 26/04	NRA Addendum to BD 26/04

* Note: Where contradictions or ambiguities arise between the standards, the standard listed higher in the order of precedence shall govern.

Consideration shall be given to columns being finished with a proprietary paint to an agreed BS or RAL colour which takes account of the environment.

The lighting column manufacturer shall be registered with and certified by either NSAI, British Standards Institute of Quality Assurance Services or Lloyds Register Quality Assurance Register for the design, manufacture, supply and verification of road lighting columns and brackets under their quality assessment schedule to ISO 9001. The quality assurance certification shall relate to the specific lighting column material being proposed. Cork City Council reserves the right to request proof of certification from the proposed column manufacturer.

- Plain tubular stepped columns, widely used to date, are no longer acceptable by Cork City Council. (This condition applies to all Public Lighting Schemes designed since the issue of Revision 2 of this document in January 2009).
- An earthing connection shall be provided in the base compartment. The fastening screw for this connection shall be stainless steel with an M8 coarse thread.
- The structural loading on the columns and brackets shall be calculated by the proposed column manufacturer / supplier in accordance with IS EN 40-3-1, using the Rationalised Wind Factor calculation as described in BS PD 6547.

The Rationalised Wind Factor (RWF) shall be: 587N/m² and the exposure category shall be Category II.

(Note: Calculations using the 60 minute storm or the 3 second gust wind speed will not be acceptable.)

- The structural design of the columns and brackets shall be verified by calculation by the proposed column manufacturer / supplier in accordance with IS EN 40-3-3.

The partial safety factors used in the calculations shall be:

Partial safety factor for materials	1.15
Partial safety factor for dead loads	1.20
Partial safety factor for live loads	1.40

Developers shall take into consideration the location at which a public lighting column is to be installed with a view to the following:

- The level of Vandalism likely, more robust columns are required in areas of high instances of vandalism. Cork City Council Traffic Division shall be consulted on this point prior to selection of column;
- Columns that are to be installed in locations inaccessible to a maintenance truck, e.g. on steps / embankments / narrow laneways etc. shall be of a hinged design to allow for maintenance;
- Outreach brackets are to be used in all instances except where Cork City Council Traffic Division explicitly permit direct pole top mounting of luminaires;
- Outreach Bracket designs are to be approved prior to installation, particularly where decorative brackets are being used;
- Public Lighting columns and ducts to be taken in charge for maintenance by Cork City Council shall not be erected on ground likely to remain private / inaccessible, e.g. private gardens, ESB / Bord Gais Substation enclosures etc;
- Account shall be taken of any traffic control measures that may be required during the installation of public lighting schemes including compliance with Chapter 8 of the Traffic Signals Manual published by the Department of Transport. This includes the requirement that a traffic management plan by a holder of a current valid traffic management designer CSCS license and implemented on site by a current valid FÁS CSCS Signing, Lighting and Guarding on roads license holder;
- Any non-lighting equipment (including signs etc.) may only be installed on public lighting columns with the explicit permission of Cork City Council Traffic Division or ESB Networks where applicable. All column design calculations shall consider the inclusion of a sign measuring 300mm x 300mm for wind loading of calculations;
- Proposed column suppliers shall confirm that their columns have a fatigue life of a minimum of 25 years in accordance with IS EN 40-3-3;

- When rooted columns are proposed, the column planting depth to be treated with a bituminous preservative on both inside and outside surfaces. The bitumen shall extend to 250mm above ground level;
- A baseboard is to be fitted in each column. Three coats of intumescent varnish shall be applied to the baseboard in order to prevent fire propagation. The varnish shall be as manufactured by Hamron (type WD-05) or approved equivalent. The rate of coverage shall be 2.5 square metres per litre in order to provide class 0 protection. The clearance between baseboard and inside face of door when secured to be not less than 100mm;
- The column and bracket assemblies shall conform with the deflection requirements of Class 2 as defined in IS EN 40-3-3;
- Design calculations are subject to review by Cork City Council and shall be submitted with proposed public lighting scheme designs if requested;
- Cork City Council may require banner arms to be installed on public lighting columns at main city centre locations. The dimensions of these banners shall be specified and both the column and foundation shall be designed and proposed to Cork City Council for approval.

4.4 Cable Design and Electrical Service Design

The electrical services design for the scheme shall be undertaken to comply with the relevant sections of ETCI National Rules, viz ET: 101 and ET: 211. In particular the requirements set out in section 714 of ET: 101 as well as all of the requirements set out in ET: 211 shall be complied with. The detailed cable design shall be undertaken to match the calculated electrical load which would typically allow between 4 and 8 fittings to be supplied per phase. The provision of earth loop / fault level calculations and circuit disconnection (fuse rupture times) shall also be completed at the design stage. Public lighting schemes requiring cable lengths in excess of 200 meters require careful design to meet the earth loop impedance requirements of ET: 101.

Disconnection / fuse rupture times shall be in compliance with those set out in ET: 101 (National Rules for Electrical Installations) rather than those specified in BS 7671 for Public Lighting and Street Furniture.

Note: In some cases Cork City Council may refer the electrical services designer to other Irish, UK or European Electrical Design Standards, e.g. BS7671 (UK wiring Regulations and / or associated guidance notes) etc.

- In all cases install power supply cable from the following shall be installed:
 - SWA Cable to BS 6346 (0.6 / 1kV);
 - SWA Cable to BS5467 / I.S. 273 (0.6 / 1kV);
 - NYCY cable to DIN VDE 0276 – 603 (0.6 / 1kV).

- Where ESB high voltage cables (11 KV / 22 KV) cables run in parallel with Public Lighting cables in ducts a minimum segregation of 300 mm shall be maintained. Where ESB high voltage cables and Public Lighting Cables cross they shall do so at right angles. The requirement of crossing at right angles also applies to gas mains;
- Fuses and circuit breakers shall have a minimum rupture capacity of 16 kA;
- Generally, the main customer service pillar customer fuse rating shall not be greater than 25 Amps;
- C-Type circuit breakers shall be used;
- The use of circuit breakers in public lighting columns is not permitted by Cork City Council, Traffic Division. Fused isolators / disconnectors shall be used in public lighting columns;
- Public Lighting cables shall not be jointed in inaccessible locations particularly where water ingress is likely. Inspection chambers / draw pits shall be installed at both sides of under carriageway crossings, at every 50m length of duct and at every change of direction $> 30^{\circ}$;
- The availability of electricity supplies shall be confirmed by the Distribution System Operator (DSO) ESB Networks prior to design of the public lighting scheme;
- Where upgrades to public lights on overhead network poles is being undertaken electrical isolation boxes (IP 65) (as produced by Killarney Plastics Limited) shall be fitted on the supply connection to each luminaire. These isolator boxes shall be approved for use by ESB Networks and shall meet the requirements set out in the National Code of Practice for Customer Interface as published by ESB Networks. Cork City Council can advise the Developer with further information if required;
- All upgraded luminaires shall be controlled via an integral photocell and not make use of the switchwire as was the practice in previous years. The switchwire shall be removed when and where required by Cork City Council or ESB Networks;
- Lucy MC040SLF fused isolators / fused cut outs shall be used in Public Lighting Columns. Circuit breakers "MCBs" shall not be used in Public Lighting columns;
- Main road public lighting schemes shall have power supply infrastructure installed with a minimum of 25% spare capacity (Maximum Installed Capacity at Customer Service Pillar, Cables to be sized for 25% additional load and at least 25% additional length) to allow for future extension. The spare capacity requirements shall be advised by Cork City Council at the design review phase;
- Cork City Council will no longer accept public lighting schemes that are centrally controlled from a contactor in the interest of energy conservation, scheme reliability and public safety. As mentioned above each luminaire shall have an integral miniature or sub-miniature photocell.

The installation of schemes in Residential Areas shall comply with the Code of Practice for Public Lighting ET211: 2003. All public lighting schemes shall include the provision and installation of a Customer Service Pillar.

4.5 Small Civil Works – Access Chambers & Ducts

Public Lighting ducting shall be 100mm diameter red polythene with smooth interior to IS 135 Class B / BS5306 Class B. Ducts shall be buried to the correct depths as specified in the ETCI National Rules (ET: 101). Minimum cable bending radii shall be observed;

Note: UK standards specify orange ducts for Public Lighting cables, this is not compliant with the Irish ET: 101 requirement that red ducts be used for public lighting cables;

Decorative Inspection Chamber: All access chamber covers on the footpath to cater for a change of direction shall be ductile iron as per Cavanagh Celtic or similar approved with frame opening 600mm x 600mm to EN 124 B125 with M16 stainless steel locking bolt or similar approved. Lock shall make provision for nut and bolt if damaged. Tapping of the frame is not permitted. If similar approved it shall be certified by an accredited Third party;

Large Inspection Chamber: All access chamber covers on the footpath to cater for a change of direction shall be ductile iron with galvanized steel frame as per Cavanagh Antelope JB5 or similar approved with frame opening 615mm x 615 mm to EN 124 B125 marked "Public Lighting" or "Traffic" with M16 stainless steel locking bolt, or similar approved. Lock shall make provision for replacement of bolt and nut if damaged. Tapping of frames is not permitted. Cover & frame shall be certified by an accredited Third party;

Medium Inspection Chamber: Access chamber covers on the footpath for straight through services shall be ductile iron with galvanized steel frame as per Cavanagh Viper Traffic JB2 or similar approved with frame opening 720mm x 260 mm to EN 124 B125 marked "Public Lighting" or "Traffic" with M16 stainless steel locking bolt or similar approved. Lock shall make provision for replacement of bolt and nut if damaged. Tapping of frames is not permitted. Cover and frame shall be certified by an accredited Third party;

Small Inspection Chamber: Access chamber covers on the footpath for straight through services shall be ductile iron with galvanized steel frame as per Cavanagh Viper Traffic JB1 or similar approved with frame opening 385mm x 260 mm to EN 124 B125 marked "Public Lighting" or "Traffic" with M16 stainless steel locking bolt or similar approved. Lock shall make provision for the replacement of bolt and nut if damaged. Tapping of frames is not permitted. Cover and frame shall be certified by an accredited Third party;

All Inspection Chambers on carriageways shall have the same dimensions as those listed small, medium and large above. In all cases the chamber shall be to EN 124 Group 4. High strength engineering brick or in situ concrete may be used to make up the manhole walls directly under the frame. Standard concrete blocks or bricks will not be allowed. Chamber covers and frames shall be manufactured by Kavanagh Foundry. Where alternative chamber covers are used they shall be approved by a suitably licensed third party (NSAI, Lloyds Register or British Standards Institute of Quality Assurance Services). The engineering bricks shall comply to BS EN 772 (formerly British Standard 3921: 1985).

Mortar shall have 1:3 cement sand dry volume ratio. The sand shall comply with BS EN 13139, BS 1200: 1996;

ESB Networks Mini-Pillars and Customer Service Pillars (Public Lighting Micro-Pillars) shall be installed a minimum of 2m apart. If this is not physically possible, and only with the explicit permission of ESB Networks and Cork City Council Traffic Division these may be installed closer together and equipotentially bonded in accordance with ET: 101. In all cases it is forbidden to utilise the same chamber to service both an ESB Networks (DSO) Mini-Pillar and Customer Service Pillar (Micro-Pillar). If this is found to be the case ESB Networks will likely refuse to connect the Customer Service Pillar and Cork City Council will not be in a position to take the Scheme in charge.

4.6 Electrical Supply (Metered and Un-Metered)

The electrical supply shall incorporate an un-metered supply for schemes with an energy demand of less than 2kVA or a metered supply point in an approved galvanised steel cabinet (stainless steel cabinet in city centre locations) as appropriate. The connection from the ESB mini-pillar to the meter cabinet shall be provided through a continuous length of red coloured polythene ducting (100mm diameter) at a depth of 600mm. The details on Customer Service Pillar shows the various cabinet options as specified by the ESB and are attached for information.

The Developer shall bear the cost of the new electrical power supply connection and shall pay for all outstanding energy bills up to the date the scheme is taken in charge (this is generally the first Monday of the calendar month). For the avoidance of doubt, new electricity supply connections are to be applied for in the name of the Developer and not Cork City Council Traffic Division. ESB Networks will not make a new connection in the name of Traffic Division without the approval of Traffic Division.

Un-Metered – Schemes less than 2 KVA

Red coloured duct (100mm diameter depending on length of run), with smooth interior wall, polythene ducting shall be installed to cater for supplies to any micro-pillars specified from the un-metered supply cabinet;

Red coloured 100mm duct, with smooth interior wall, polythene ducting shall be installed to cater for connections to each of the columns.

Metered Supplies – Schemes greater than 2 KVA

Red coloured duct (100mm diameter depending on length of run), with smooth interior wall, polythene ducting shall be installed to cater for supplies to metered supply cabinet;

Red coloured 100mm duct, with smooth interior wall, polythene ducting shall be installed to cater for supplies to micro-pillars from the metered supply cabinet.

In the case of metered supplies, it is recommended that location of the meter cabinet be selected to cater for all further up-grades to lighting, traffic signals and signs etc. in the area with details to be agreed with ESB Networks.

An additional 100mm twin wall orange duct shall be install in tandem with the public lighting ducting when and where directed by Cork City Council. This shall be advised at the design phase.

The electrical contractor shall provide a Completion Certificate for the public lighting scheme and shall be responsible for progressing the application for supply to completion and switch-on of the scheme. The customer copy of the electrical test certificate shall be retained and submitted to Cork City Council, Traffic Division with the completed take in charge form as detailed below.

4.7 Lighting Engineering Consultants

The Traffic Division has a list of engineering consultants, among others, who are in a position to undertake the Lighting and Electrical Supply Design for street lighting, sports lighting and or floodlighting schemes in accordance with the CEN code of practice, national rules for electrical installation “ETCI regulations” and Cork City Council requirements.

The Developer can contact the Traffic Division of Cork City Council for information.

4.8 Street Lighting – Equipment Manufacturers and Suppliers

Lighting schemes implemented by Cork City Council have included equipment manufactured by various suppliers. The Developer can contact the Traffic Division of Cork City Council for information.

4.9 Electrical Contractors

Electrical Contractors shall be in a position to supply and install a complete Public Lighting scheme to comply with ETCI National Rules and shall be responsible for coordinating the application to ESB Networks for the connection and to ESB for the supply of electrical power. The Developer shall bear the cost of the new connection fee and will pay the energy bill until the scheme is taken in charge by Cork City Council Traffic Division.

Cork City Council has a panel of five electrical contractors that are used for Public Lighting Works undertaken by or on behalf of the Roads and Transportation Directorate. These are listed in the appendix.

4.10 Temporary Lighting

In the cases where a Development will include for the replacement of a public lighting scheme Cork City Council may require that a temporary public lighting scheme be installed whilst construction works are undertaken. Instances where this may be required include but are not limited to:

- Where building supported public lighting fittings are removed to facilitate the development;
- Where extensive excavations are likely on “brown field sites” or where demolition of existing buildings is taking place. (In this case Cork City Council and / or ESB may deem that the risk of a live underground cable being excavated and damaged is high

and arrange that the cable is isolated. In this case the Developer shall be responsible for the provision of temporary public lighting until such time as the new scheme is installed and commissioned).

Temporary lighting installations must take account of section 704 of the National Rules for Electrical Installations pertaining to construction sites. Account also needs to be taken of the positioning and angles of temporary lights so as to minimize glare and prevent dazzling drivers and pedestrians.

Note: Public Lights may only removed with the permission of Cork City Council. The Developer shall prior to removing a public light commission into service and maintain operational temporary lighting until such time as he/she replaces the removed light(s) with a new scheme. Failure to do this will likely result in the Developer being liable in the event of any Public Liability claim against him / the Council where public lighting is cited as a contributing factor.

4.11 Night Time Lighting of Buildings and Structures

Proposals to light buildings and bridges of particular merit are of interest to Cork City Council in an effort to promote an enhancement to the night-time scene in Cork. These Guidelines have been drawn up as part of a strategy to ensure that lighting schemes are designed & implemented in line with sustainable development policies.

- It is envisaged that the design proposals would meet Best Practice criteria to provide a “Low Brightness” approach to lighting thus ensuring that an energy efficient scheme can put in place from the outset;
- The design should be undertaken by a professional lighting designer, being a service that is often made available by Engineering and Architectural Consultants, in liaison with lighting equipment manufacturers;
- Selective highlighting of a building or feature should be considered as against floodlighting. It is often the case that far too much light is projected onto a building destroying an appreciation of its architecture;
- Emerging technologies based on LED and fibre-optic sources can be used to highlight architectural features with much lower energy levels being required to deliver the desired impact. Luminaires should incorporate electronic control gear to improve energy efficiency and improve the operational lifetime of lamps;
- Choose lamp type and colour temperature sympathetic to the building material being lit. In general terms, high pressure sodium used on its own is a poor choice for many building materials, as it flattens textures and some colours;
- Avoid using a small number of high wattage, wide-angle luminaires which will flatten the façade and wash out its features;
- Avoid mounting fittings parallel to the building – improved modeling of buildings will usually be achieved by lighting at an angle;

- Daytime appearance of fittings and cable is an important consideration – if possible try to conceal fittings behind shrubs, trees or building features;
- Consider glare to people inside the building looking out through windows – down-lighting and spotlights or ground recessed fittings located at close-offset positions to the wall or building will usually avoid such glare;
- Where possible, spotlights or floodlights should be fitted with louvers and cowls to control the beam and avoid sideways light spill;
- Ensure that beams do not spill over the roof or around the side walls as this will create light pollution or glare nuisance to neighbours;
- For schemes being proposed for church buildings, the feasibility of providing back-lighting of the Stained Glass windows could be considered if the particular feature is visible to the public;
- Amenity lighting may also have to be considered at the design stage to compensate for glare and ensure safe access to the building after dark when the floodlighting is in operation;
- It is proposed that copies of the Floodlighting Design would be handed over the Engineering Consultant or to the Electrical Contractor, as nominated by the church authority or building owner, with a view to agreeing a detailed design and providing a budget estimate for the proposal;
- Typically, copies of the following Ordnance Survey Ireland Maps and drawings identifying the site location and elevation details would be required to undertake a Lighting design:

OS Site Location Map Scale 1:1000

OS Site Detail Drawing Scale 1:500 or 1:250

Front Elevation of the Building & Side Elevations of the building if necessary.

- Floodlighting schemes should in general be designed to switch-on at dusk with photo-cell control and be switched off at mid-night using a time-clock;
- It is accepted that floodlighting schemes can be modified to take account of changes recommended at the final installation stage as a result of on-site trials and therefore some details may have to be confirmed at that stage;
- A visualization software suit shall be utilized to demonstrate the floodlighting scheme on submission of the design.

Cork City Council, through the Traffic Division is available to discuss proposed floodlighting schemes in the city with a view to insuring that a “Low Brightness” approach is adopted. Lighting Design for new and replacement schemes should take account of these Guidelines to ensure that attractive energy efficient schemes are implemented.

4.12 Floodlighting Schemes

Where floodlighting schemes of playing fields, pitches or courts etc. are being proposed by sports clubs, schools etc. it should be noted that these are subject to the planning process. Cork City Council has the following requirements in the implementation of such schemes:

The energy efficiency of the proposed scheme must be central to the design process. The use of modern energy efficient floodlighting lamps and control gear is required. This will have obvious benefits to the scheme owners;

Use shall ideally be used of a competent lighting designer, this may include the use of the lighting suppliers in-house design service;

The choice of light source will depend on the type of colour rendering required;

The scheme designer shall demonstrate to Cork City Council by way of a design submission that minimizes light pollution, eliminates as far as is possible light spill into neighboring property and takes account of the "Campaign for Dark Skies";

The scheme designer will aim to minimize or eliminate glare from the proposed lighting scheme;

The scheme designer shall take account of the location of the proposed scheme in relation to the requirement for an aircraft warning light on the top of the light support structure (e.g. in the case of high structures). In this regard the Irish Aviation Authority may need to be consulted;

Account shall be taken pertaining maintainability of the scheme following commissioning including site access etc;

The flood lighting scheme shall incorporate the facility to cater for training rather than against competition events, viz. the scheme shall allow for a reduced level of lighting to be achieved when full illumination levels are not required. This is in the interest of reducing energy consumption.

4.13 Review of Public Lighting Schemes

Street lighting designs must be submitted to Cork City Council, Traffic Division for approval in line with Planning Conditions prior to commencement of construction at site. Traffic Division will advise the Developer if the proposed public lighting layout meets the requirements of this guidance document and the standards specified within it. The lighting design details submitted for approval shall comprise the following:

- Lighting layout drawings (in dwg format to allow for design verification);
- Public lighting specification;
- Appropriate Standard Construction Details (SCD's);
- Electrical drawings (schedules and layouts);
- Details of proposed columns and brackets;
- Public Lighting Design Report (see note).

Cork City Council will on receipt of the submitted material advise if any changes are required and if the scheme is acceptable to proceed to construction stage. Cork City Council, Traffic Division endeavors to advise of its review of public lighting scheme designs within three to four weeks of receipt of all required information.

Note: Cork City Council use Lighting Reality software for public lighting scheme design undertaken in house. In this regard, Public Lighting designs in RTMA format shall be submitted to the Council at the design review stage and if applicable again at the take in charge stage.

4.14 Taking in Charge

The taking in charge of a lighting scheme is a separate procedure whereby the Developer shall satisfy Cork City Council and the DSO (ESB Networks) that the scheme conforms with the ETCI National Rules for Electrical Installations, and the Developer shall also satisfy Cork City Council that the layout and levels of lighting conforms to the CEN Code of Practice.

The take in charge form is included in the appendix to this document. A Developer wishing to have a public lighting scheme taken in charge for energy and maintenance shall complete this form and submit it to Cork City Council, Traffic Division, Electrical Engineering Section along with the following (if not previously submitted):

- As built Lighting layout drawings (in .dwg format to allow for design verification);
- Appropriate Standard Construction Details (SCD's);
- As Built Electrical drawings (schedules and layouts);
- Public Lighting design;
- A signed copy of the electrical test certificate for the public lighting installation (A copy of the signed original will suffice);
- An energy supply bill showing the account cleared.

Cork City Council, Traffic Division endeavors to undertake an inspection of a public lighting scheme following receipt of a correctly completed request for take in charge of public lighting schemes within three to four weeks.

On completion of the inspection which will typically be undertaken by both City Council Staff and / or ESB staff (or another electrically competent agent of the City Council), we shall compile a snagging list of outstanding issues if any are found.

When the Developer confirms that the snagging list has been completed a further inspection will be undertaken. In the event that the snagging list has not been completed to the satisfaction of the City Council, Traffic Division the Developer shall be informed. Should further intrusive inspections be required, Cork City Council reserves the right to charge the inspection cost to the Developer, to be paid prior to commencement of the inspection. This shall be charged at the discretion of Cork City Council, Traffic Division at a rate of not less

than €200 Excl VAT per inspection. Inspections requiring significant time and resources may be charged at a higher rate at the discretion of the Council.

When Cork City Council confirms that the public lighting scheme is in a suitable condition to be taken in charge, it shall inform the Developer by means of a formal letter. The Planning and Development Directorate (which oversees the entire take in charge procedure for developments) may request that the Public Lighting Scheme in a development is taken in charge at the same time as the remainder of the Public Domain in that development. Typically in this case Cork City Council, Traffic Division requires that the Public Lighting Scheme be maintained operational and in the same condition as it was when the snagging list was completed to Traffic Divisions satisfaction by the Developer.

Cork City Council will also require that each column and customer service pillar installed have "Cork Cit Council / ESB" style label attached with a numbering scheme agreed with the Developer at the taking in charge stage. This is to allow for maintenance coordination, column / luminaire identification and recording of the individual column in Cork City Council's Public Lighting Asset Management Database.

4.15 Further Information

Cork City Council reserves the authority to ensure that public lighting schemes are installed to the required Code of Practice before the scheme can be taken in charge with the purpose of providing for energy and maintenance costs.

Further requests for information should be directed to Cork City Council, Traffic Division (Electrical Engineering Section). We can give further guidance on public lighting scheme design layouts etc. and answer questions pertaining to the two public lighting standards covered in this guidance manual, viz. BS5489: 2003 and EN 13201: 2003.

Cork City Council Traffic Division wish to work with Developers to help deliver good quality public lighting installations which meet the relevant standards and which improve the general ambiance of the city and help to reduce energy consumption.

The electrical section is also available to advise on any other electrical installations that may require city council input and are contactable as follows:

Traffic Division (Electrical Engineering Section),
Roads and Transportation Directorate,
Cork City Council,
City Hall,
Cork.

Phone: 021 – 4924452
Fax: 021 – 4924495
E-mail: traffic@corkcity.ie

4.16 Appendix

Electronic ballast manufacturers

The following manufacturers, among others, are in a position to supply electronic ballasts for street lighting lanterns:

SELC Ireland Limited,
Industrial Estate,
Belmullet,
Co. Mayo,
Ireland.
Phone 097-81209
www.selc.ie

Street Lighting – Columns & Equipment Manufacturers and Suppliers

Lighting schemes implemented by Cork City Council has included equipment manufactured by various suppliers including the following listed with contact details:

DW Windsor:
Street & Park Equipment,
PO Box 2134, Swords,
Co. Dublin.
Contact: Declan McGinn,
Phone: (01) 840 0633,
email: info@streetandpark.com
Web: www.streetandpark.com

NERI Lighting:
NERI Lighting, Bradgate Lighting & Furnishings Ltd.,
PO Box 45837 London E11 2WN
Contact: Brian Bradley
Phone +44 7860 58 3361 Web:
www.neri.biz
email: neri@bradgateltd.com

Philips Lighting:
Philips Electronics Ireland Ltd.,
Newstead,
Fonthill Industrial Park,
Dublin 22.
Phone: 01 - 7640000
Web: www.philips.ie

Siteco:
Castit Limited,
Unit 612 Northern Extension,
IDA Business Park,
Waterford.
Contact: Patrick Lawlor Phone (051) 370393,

E-mail patrick@castit.ie
www.castit.ie

URBIS: URBIS Lighting Ltd.,
Mountseaton,
Camolin,
Co Wexford.

Contact: Patrick Redmond Phone: +353 (0)54 83711 or + 44 1256 354446
<http://www.urbislighting.com/>

Veelite
Light.ie,
Kilbarry,
Waterford,
Ireland.

Contact: Jeralee O'Byrne:
Phone + 353 – (0)51 – 875399
Fax: + 353 – (0)51 – 878437
E-mail: info@light.ie

Suppliers of Lighting Columns only:

Lampost Construction Components Ltd.,
Greenore,
Co. Louth.
Contact: Oliver Murphy Phone:
+353 42 937 3554 / 937 3283 lampost@iol.ie
Tapered hexagonal and polygonal columns

'Spectrallyte' Composite GRP Columns - Road Sign Services (RSS)
31 North Avenue, Mount Merrion
Co. Dublin
Ireland
Contact: Richard Strahan Tel: +353 1 283 2823
Mobile: +353 87 24 23 634
E-mail: richard.strahan@rss.ie
<http://www.rss.ie/>

Public Lighting Contractors (Electrical)

Ian Foley Electrical Services Ltd,
East End House,
Poulavone,
Ballincollig,
Co. Cork
Tel: (021) 4876595
Fax: (021) 4823010
info@ifes.ie

Contact: Ian Foley (Director),

O'Shea's Electrical Ltd,
Euro Business Park,
Little Island,
Co. Cork.
Tel: (021) 4510700
Fax: (021) 4510739
E-mail: bnolan@joneseng.com
Contact: Brian Nolan,

Read Electrical Co. Ltd,
Castle Building,
Damastown Business Park,
Mulhuddart,
Dublin 15.
Tel: (01) 8614844
Fax: (065) 8614845
E-mail: paulread@readelectrical.com
Contact: Paul Read (Director),

Sean Ahern Limited,
16 Southlink Park,
Ballycurreen,
Cork
Tel: (021) 4273227
Fax: (021) 4318845
E-mail: info@ahernelec.ie
Contact: Michael Ahern (Director),

Utility Solutions Ireland Ltd,
Beenreigh,
Abbeydorney,
Co. Kerry
Tel: (066) 7135710
Fax: (066) 7135720
E-mail: usi@tli.com
Contact: Peter McCarthy (Principal).

4.17 Taking in Charge Form

CORK CITY COUNCIL'S PUBLIC LIGHTING TAKE IN CHARGE FORM



This form must be submitted to the Traffic Division, Cork City Council prior to an Estates public lighting being taken in charge.



Planning number	
Building contractor contact name and details	
Name	
Address	
Contact tel no.	
Email address	
Name of estate/development	
Date of installation	
Type of installation	New/ alteration
Road (off which located)	
Address	
Name of Developer	
Name of Electrical contractor	
Name of civil contractor	
Quantity of column mounted/ Network pole mounted /wall facade mounted fittings installed	
Watt Rating	
Lantern manufacturer	
Lantern model	
Lantern type (e.g. Son-T)	
Column height	
Column type	Tapered tubular, tubular, stepped tubular
Column supplier	
Bracket supplier	
Bracket length	
ESB supply point	Metered supply/ unmetred network pole top/ unmetred micro pillar
Number of connection points	
TMPRN /MPRN	
Metre details (if applicable)	
MIC	
Phases	
DUoS	
Protective device rating	
Cable size: pillar to column	
ETCI form no.	
Certifying electrician	
Min insulation resistance	
Max resistance of protective conductor	
Max fault loop impedance	

- A map of the site detailing the column positions and numbers must be provided indicating as built positions of columns, power supply locations and circuits. This map should include the development boundaries and adjacent roadways.
- Please ensure all planning issues are addressed prior to submitting this form.
- To facilitate the efficient taking in charge of the scheme all power supply bills must be paid up to date and the last bill forwarded to Cork City Council with account details attached. It is important that the development in question is the only development attached to the account number.

Section 5: Sewers & Drains

5.1 General

Drainage works shall generally comply with the following:

- a. BS EN 752:2008 "Drain and sewer systems outside buildings"
- b. BS EN 1671:1997 "Pressure sewerage systems outside buildings"
- c. NRA "Specification for Roadworks"
- d. DoELG "Recommendations for Site Development Works for Housing Areas"
- e. DoELG Building Regulations, Technical Guidance Document H "Drainage"

5.2 Drains and Sewers

All sewers are public property and are the responsibility of Cork City Council. Sewers are generally located in the public carriageway or within a wayleave if located in private property.

All drains are private property and are the collective responsibility of all private parties discharging to them. All drains remain private property until they connect to the public sewer.

Drains that are proposed to be taken in charge shall remain drains until such time as they are taken in charge. When such drains are taken in charge they shall then be regarded as sewers. All such drains shall be regarded as sewers for the purposes of design.

All drains shall be in accordance with Technical Guidance Document H and DoELG "Recommendations for Site Development Works for Housing Areas". No single foul drain shall serve more than 8 dwellings.

5.3 Accessibility

No sewer shall be within 5m of an existing or proposed structure unless otherwise approved by the Drainage Section.

All sewers shall be easily accessible for maintenance and repair. Sewers shall be laid in public roadways or public open spaces. No sewers shall be laid in private land without the approval of the Drainage Section. Where sewers are shown located other than in roads, wayleave maps shall be submitted to the Drainage Section.

5.4 Pipe Types

The following pipes and fittings may be used for both foul and storm sewers:

- a. Spigot and socket concrete pipes and fittings complying with BS 5911:2002;
- b. uPVC pipes and fittings complying with BS ENN 1401-1:1998;
- c. Ductile iron pipes and fittings complying with BS EN 545:1995;
- d. Other pipes and fittings may be used, subject to the approval of the Drainage Section.

Joint types shall be subject to the approval of the Drainage Section.

5.5 Pipe Design

All new sewers shall be designed to convey all estimated flows from the proposed development together with any flows from contiguous areas which would naturally drain towards the development.

Full and detailed designs and calculations for all new sewers shall be submitted to and approved by the Drainage Section.

5.5.1 Storm Sewers

All new drainage shall be separated, even where draining into a combined system. All storm runoff from paved and roofed areas shall drain to storm drains or sewers only. There shall be no discharge of storm runoff to foul drains or sewers.

All pipes shall be designed to cater for the estimated flows from the proposed development together with any undeveloped flows from contiguous areas, which would naturally drain towards the development.

Full and detailed design and calculation for all drainage systems shall be submitted to and approved by the Drainage Engineer's Department.

The time of concentration of a storm drainage system is the time required for a drop of rain to travel from the furthest point in the drainage catchment to the outfall. Where the time of concentration of a storm drainage system at its outfall is less than or equal to 15 minutes, the sewer diameters shall be sized in accordance with the Llyod-Davis Method.

The allowable capacity of a sewer pipe shall be determined using the Continuity Equation as follows:

$$Q = VA.$$

Where:

- Q = Pipe-full Flow Rate (m³/s);
- V = Flow Velocity (m/s);
- A = Cross-sectional Area of Pipe (m²).

V shall be determined using the Colebrook-White Equation as follows:

$$V = -2(2gDS_f)^{1/2} \log_{10}((k_s / 3.7D) + (2.51v / (D(2gDS_f)^{1/2}))).$$

Where:

- g = Newton's Gravitational Constant = 9.81m/s²;
- D = Pipe Diameter (m);
- S_f = Hydraulic Gradient = Sewer Gradient (Non-Surcharged);
- k_s = Pipe Roughness Height (m) = 0.6x10⁻³m for Concrete Pipes;
- v = Kinematic Viscosity (m²/s) = 1.003x10⁻⁶m²/s at 20°C.

Where the time of concentration is greater than 15 minutes, the sewer diameters shall be sized in accordance with the Wallingford Procedure.

Rainfall intensity shall be determined using the Dillon Equation as follows:

$$I = 152.4 \times (T_p^{1/5} / t^{3/5}).$$

Where:

- I = Rainfall Intensity (mm/hr);
- T_p = Return Period (yr);
- T = Storm Duration (min).

All storm sewers shall be designed not to surcharge when conveying all flows arising within a return period of 5 years. All storm sewers shall be designed not to cause flooding when conveying all flows arising within a return period of 20 years.

All storm sewers shall have a minimum nominal diameter of 225mm.

5.5.2 Foul Sewers

All new drainage shall be separated, even where draining into a combined system. All foul water from wc's, whb's, sinks, baths, showers, washing machines, dishwashers, etc shall drain to foul drains or sewers only. There shall be no discharge of foul water to storm drains, or sewers, or to any river, stream or watercourse.

All foul sewers shall be designed not to surcharge when conveying 6 times Dry Weather Flow (6DWF). DWF shall be determined on the basis that each dwelling shall contribute 1,000 l/day to the foul drainage system.

All foul sewers shall have a minimum nominal diameter of 150mm, subject to the approval of the Drainage Section. Depending on configuration, inflow, layout etc this requirement may be increased to a minimum nominal diameter of 225mm.

5.6 Pipe Gradients

All sewers shall be laid with even gradients between manholes. Uneven gradients shall not be permitted.

Sewer gradients shall be such that at least once per day the velocity of flow will be self-cleansing. Pipes carrying foul sewage shall have sufficient gradient to produce velocities not less than 0.75 m/sec at 2 D.W.F. Surface water sewers shall have minimum gradients to ensure velocities of at least 0.75 m/sec at design flow.

All sewers with a nominal diameter of 150mm shall have a minimum gradient of 1 in 150.

All sewers with a nominal diameter of 225mm or greater shall have a minimum gradient of 1 in 200. Any gradients less than 1 in 200 shall be subject to the approval of the Drainage Section.

5.7 Minimum Cover to Pipes

Cover is the distance between the finished ground level over a sewer and the crown of the sewer. All sewers shall be laid with a minimum cover of 1.2m in roads and footpaths immediately adjacent to roads and 0.9m in all other areas. Any reduction in minimum cover shall be subject to the approval of the Drainage Section.

5.8 Bedding and Haunching to Pipes

Where sewer diameters are 450mm or larger, the Drainage Section shall be consulted with regard to bedding details. Where sewer diameters are less than 450mm, bedding types suitable for typical ground conditions shall be as set out below.

5.8.1 Bedding and Haunching to Rigid Pipes

All pipes shall be laid on a bed of granular material with a minimum thickness of 100mm. Granular material should be either 14mm to 5mm graded aggregate or 10mm single sized aggregate, complying with the requirements of IS 5: Part 1: 1990, Table 7 and should have a Compaction Factor value not greater than 0.2 when measured in accordance with BS EN 752.

All pipes shall be haunched to half pipe height with granular material. The granular material shall be placed uniformly on either side of the pipe in compacted layers not exceeding 100mm in depth.

5.8.2 Bedding and Haunching to Flexible Pipes

All pipes shall be laid on a bed of granular material with a minimum thickness of 100mm.

All pipes shall be haunched and surrounded to a minimum depth of 100mm above the crown of the pipe with granular material. The granular material shall be placed uniformly on either side of the pipe in compacted layers not exceeding 100mm in depth until the pipe has a minimum of 100mm of compacted cover.

5.9 Backfilling of Trenches

Where pipes are laid in paved areas, Clause 804 granular material to NRA Specification for Roadworks shall be used for backfilling. Elsewhere, selected fill material shall be used for backfilling. Selected fill shall be free from stones greater than 40mm in size, building rubbish, tree roots, vegetable matter and lumps of clay greater than 75mm in size.

Clause 804 granular material shall be laid in compacted layers not exceeding 100mm in depth.

Selected fill shall be laid in compacted layers not exceeding 300mm in depth.

Where pipes are supported by concrete, backfilling shall not commence until the concrete has reached a minimum crushing strength of 14N/mm^2 .

5.10 Manholes

5.10.1 General

Manholes shall be provided at the following locations:

- a. At the head of every sewer;
- b. At every bend;
- c. At every change in gradient;
- d. At every change in pipe diameter;
- e. At every junction of 2 or more sewers;
- f. The maximum distance between consecutive manholes shall not be greater than 80m.

Straight sewer runs between manholes shall only be permitted.

5.10.2 Bases

All manhole bases shall be cast in-situ or pre-cast concrete. The concrete used in cast in-situ manhole bases shall be 30N/mm^2 minimum strength with 20mm maximum aggregate size. All pre-cast concrete bases shall comply with BS 5911-4:2002.

Where the distance from cover to invert is less than or equal to 3.3m, the minimum cast in-situ base thickness shall be 150mm. Where the distance from cover to invert is greater than 3.3m, the minimum cast in-situ base thickness shall be 225mm. Alternatively, pre-cast concrete bases may be used.

5.10.3 Walls

All manhole walls shall be cast in-situ walls or pre-cast concrete rings. All manhole walls shall be adequately reinforced where required. Minimum cover to reinforcement shall be 40mm. The concrete used in cast in-situ walls shall be 30N/mm^2 minimum strength with 20mm maximum aggregate size. All pre-cast concrete rings shall comply with BS 5911-4:2002:

Where the distance from cover to invert is less than or equal to 3.3m, the minimum wall thickness for cast in-situ walls shall be 200mm. Where the distance from cover to invert is greater than 3.3m, the minimum wall thickness for cast in-situ walls shall be 300mm.

All pre-cast rings shall be provided with watertight joints and shall be externally encased in 150mm minimum thick concrete. The concrete used in encasing the pre-cast rings shall be 30N/mm² minimum strength with 20mm maximum aggregate size. Care shall be taken to pack the concrete under all incoming and outgoing sewers.

5.10.4 Roof Slabs

All manhole roofs shall be cast in-situ or pre-cast concrete slabs and shall be adequately reinforced to carry all loads. All manhole roofs shall have a minimum thickness of 150mm. Minimum cover to reinforcement shall be 40mm. The concrete used in cast in-situ manhole roofs shall be 30N/mm² minimum strength with 20mm maximum aggregate size. All pre-cast concrete roof slabs shall comply with BS 5911-4: 2002.

An access ope shall be formed in the roof slab. The minimum dimensions of the access ope shall be 600mm x 600mm if the manhole over is rectangular or 600mm diameter if the manhole over is circular.

5.10.5 Covers and Frames

All manhole covers and frames shall be Class D400 in accordance with BS EN 124: 1994. All frames shall be 150mm deep. Covers with a hinged type locking device shall not be permitted in areas liable to flooding.

The minimum opening dimensions shall be 600mm x 600mm if the ope is rectangular or 600mm diameter if the ope is circular.

1 to 2 courses of engineering brick shall be used to support the frame on the manhole roof. Standard concrete blocks or bricks shall not be permitted. 3 courses or more shall not be permitted. All engineering bricks shall be Class B to BS 6905: 1991. All frames shall be bedded and haunched in mortar. All engineering bricks shall be bedded and pointed in mortar. All such mortar shall have a 1:3 cement sand dry volume ratio. The sand shall comply with BS EN 12620:2002.

5.10.6 Manhole Dimensions

Where sewer diameters are 450mm or larger, the Drainage Section shall be consulted with regard to manhole dimensions. Where sewer diameters are less than 450mm, manhole dimensions for typical sewer arrangements shall be as set out below.

Where pre-cast concrete rings are used to form the manhole walls, the minimum internal diameter of such rings shall be 1.2m.

Where manholes are cast in-situ, the minimum internal plan dimensions of the chamber shall be 1.2m x 1.0m with the longer dimension parallel to the main channel.

Manholes with a curved channel or with a difference in level of over 300 mm between the main incoming and outgoing sewers require special consideration and the dimensions shall be subject to the approval of the Drainage Section.

5.10.7 Channels

All channels shall consist of pre-formed half circle channel pipes or clayware pipes cut to form channel pipes. These channel pipes shall extend for the whole length of the manhole and shall be bedded and pointed in 1:3 cement sand mortar.

Alternatively, the sewer pipe may, where practicable, be laid through the manhole and the crown of the pipe cut out to half diameter.

Alternatively, pre-cast concrete bases incorporating pre-formed channels and benching may be used.

At manholes where there is a change in pipe size between the main incoming and outgoing sewers, the connecting channel shall include a suitable proprietary taper. Where a suitable taper is not available, the channel shall be formed using cast in-situ concrete. The concrete used in forming the channel shall be 30N/mm² minimum strength with 20mm maximum aggregate size. The resulting channel shall then be smooth trowel finished using a 1:3 cement sand mortar.

5.10.8 Benching

All manholes shall be benched to a level not less than that of the soffit of the main outgoing sewer. The benching shall rise vertically from the channel and, at the soffit level of the main outgoing sewer, benching shall then slope upwards to the chamber walls at a gradient of 1 in 30. All benching shall be smooth trowel finished using a 1:3 cement sand mortar. The mortar finish shall be flush with the top of the channel and shall not obstruct the channel in any way. The concrete used in forming the benching shall be 30N/mm² minimum strength with 20mm maximum aggregate size.

Where there are more than one incoming drains or sewers discharging to a manhole, the benching shall be so shaped as to guide the flow in the direction of the outgoing sewer.

5.10.9 Branch Connections to Manholes

Branch connections to manholes shall be laid so that the soffit level of the branch connection shall be equal to or higher than that of the main outgoing sewer from the manhole. Branch connections to manholes shall not be permitted where the soffit level to the branch connection is lower than that of the main outgoing sewer. Where the soffit level of the branch connection is higher than that of the main outgoing sewer, an external backdrop shall be constructed. The soffit level of all backdrop outlets shall be equal to that of the main outgoing sewer.

5.10.10 Step Rungs and Ladders

Where the distance between cover level and invert level is greater than 1.0m and less than or equal to 4.5m, step rungs shall be provided. Step rungs shall comply with BS EN 13101:2002. Step-rungs shall be installed at 300mm vertical intervals. The distance between cover and the top step rung shall be a maximum of 450mm. The distance between the bottom step rung and the benching shall be a maximum of 300mm. Pre-cast concrete units should have built-in step rungs

Where the distance between cover and invert is greater than 4.5m, fixed ladders shall be provided. All ladders shall be fabricated from mild steel complying with BS EN 10025:1990 and shall be hot-dipped galvanized in accordance with BS EN ISO 1461:2009. Stringers shall not be less than 65mm x 12mm in section and rungs shall be not be less than 25mm in diameter. Stringers shall be adequately supported from the manholes wall at intervals of not more than 2.4m. All stringers shall be bolted to cleats to facilitate renewal. The distance between cover and the top rung shall be a maximum of 450mm. The distance between the bottom rung and the benching shall be a maximum of 300mm

All step rungs and ladders shall be centered under the access opening.

5.10.11 Additional Safety Features

Where the main outgoing pipe has a diameter greater than 450mm and/or where the manhole is deeper than 6m, additional safety features may be required, such as toe-holds, safety railings, platforms and safety chains. Reference shall be made to BS EN 752:2008 in such circumstances.

5.10.12 Access Shafts

Access shafts are permitted in deep manholes, provided that the distance between the top of the benching and the soffit of the main chamber roof slab is no less than 2.0m. The minimum internal dimensions of the access shaft shall be 0.9m x 0.9m. The corresponding opening in the main chamber roof slab shall be 0.9m x 0.9m also.

All access shaft walls shall be cast in-situ walls or pre-cast concrete rings. All manhole walls shall be adequately reinforced where required. Minimum cover to reinforcement shall be 40mm. The concrete used in cast in-situ walls shall be 30N/mm² minimum strength with 20mm maximum aggregate size. The minimum wall thickness for cast in-situ access shaft walls shall be 200mm.

All pre-cast concrete rings shall comply with BS 5911: Part 200. All pre-cast rings shall be provided with watertight joints and shall be externally encased in 150mm minimum thick concrete. The concrete used in encasing the pre-cast rings shall be 30N/mm² minimum strength with 20mm maximum aggregate size.

5.11 Testing of Sewers and Drains

The Developer shall retain the services of a suitably qualified Consultant Engineer in private practice to design the sewer collection system and supervise the construction of same including witnessing all tests. The Consultant Engineer shall provide a collateral warranty in respect of the satisfactory design and construction of the drainage works to the City Council the Collateral Warranty shall be for a period of 6 years after practical completion of the works. A copy of all signed test certificates shall be kept on site and shall be included in the handover documentation as part of the Taking in Charge procedure.

On completion of all connections and manholes and prior to backfilling, all sewers and drains shall be tested by the water test or the air test. The Drainage Section shall witness the testing of all sewers. Adequate notice shall be given to the Drainage Section in this respect.

5.11.1 Water Test

The water test shall be conducted for a minimum of 30 minutes under a head of water not less than 1.0m over the crown of the pipe at the upstream end and not more than 2.5m of water over the crown at the downstream end. The pipeline should stand for 2 hours after filling. The maximum allowable loss of water per 30 minutes per 100m of pipe shall be as follows: 7.5 litres for 150mm diameter; 11.25 litres for 225mm diameter; 15 litres for 300mm diameter. For pipe diameters in greater than 300mm, the Drainage Section shall be consulted for the maximum allowable water loss.

Where sewers or drains fail the water test, remedial work shall be undertaken and the sewer or drain retested until such time as the sewer or drain passes the water test.

5.11.2 Air test

Air shall be pumped into the section of sewer or drain under test until a pressure of 100mm of water is indicated on a U-tube connected to the system. The pipeline should stand for 5 minutes. The air pressure shall not fall to less than 75mm head of water during a period of 5 minutes without further pumping,

Failure to pass this test is not conclusive and, when failure does occur, a water test shall be carried out. Acceptance or rejection of the line under test shall be based on the results of the water test.

5.12 Infiltration Test for Manholes

Infiltration tests shall be carried out on all manholes after backfilling. The maximum infiltration should not exceed 1 litre per hour per square metre of internal surface area of the whole of the manhole. All visible leaks should be repaired.

5.13 Drain to Sewer Connections

5.13.1 New Connections

New Connections of drains to sewers shall be made by one of the following methods:

- a. Where there is a manhole adjacent, the connection should be made at the manhole;
- b. Where there is no manhole adjacent, it may be necessary to construct a new manhole;
- c. Where connecting a drain directly to a sewer, an oblique type junction or saddle must be used. A saddle type connection may only be used in cases where the diameter of the sewer pipe is at least twice the diameter of the incoming drain. A slow bend may be used immediately upstream of the connection, subject to the approval of the Drainage Section.

5.13.2 Existing Connections

A CCTV survey shall be carried out of all existing drain connections to the public sewers and results submitted to the Drainage Section.

- a. Where existing connections to the public sewerage are to become redundant the public sewerage shall be made good.
- b. Where existing connections are to be retained any necessary remedial works shall be carried out, the scope of these works will be determined by the Drainage Section.

5.14 Soakways

The Drainage Section promotes the use of soakaways as a means of on-site storm runoff disposal. Soakaways are only permitted where the infiltration characteristics of the ground are suitable and where the installation of a soakaway is not likely to have any long-term deleterious effects, such as the washing out of fine material leading to structural instability. All soakaways shall be designed in accordance with BRE Digest 365. The rainfall data used in such design shall relate to Scotland and Northern Ireland as contained in BRE Digest 365.

5.15 Balancing Tanks

The Drainage Section promotes the attenuation of storm runoff rates to green-field runoff rates as a means of reducing peak flows and increasing base flows in the City's

watercourses. The green-field runoff rate shall be determined using the following equation as derived in the Institute of Hydrology Report Number 124:

$$QBAR = 0.00108 \times AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}.$$

Where: QBAR = Mean Annual Peak Flow (m³/s);
AREA = Area of Catchment (km²);
SAAR = Standard Annual Average Rainfall (mm);
SOIL = Soil Index (between 0.15 and 0.5).

Where the catchment area is in excess of 24 Ha, the above equation is inappropriate and the Drainage Section shall be consulted.

Full details and calculations relating to proposed attenuation arrangements, including proposed flow controls, shall be submitted to and agreed with the Drainage Section.

5.16 Pumping Stations and Rising Mains

All pumping stations and rising mains shall be designed in accordance with BS EN 1671:1997 "Pressure sewerage systems outside buildings".

All pumping stations shall:

- a. Deliver a peak flow of 6DWF;
- b. Have a 100% standby capacity;
- c. Include a telemetry outstation to the specification of the Drainage Section;
- d. Have all pipework adequately restrained.

Full details and calculations of all pumping stations and rising mains shall be submitted to and agreed with the Drainage Section.

5.17 Buildings Other than Domestic Dwellings in Residential Estates

If buildings other than domestic dwellings are proposed as part of a residential development, petrol interceptors, grease traps, and other special drainage features may be required. The Drainage Section shall be consulted in this respect.

5.18 Flooding & Minimum Floor Levels

The Location of each proposed development is to be researched on the basis of Draft Lee CFRAMS Report to determine the potential for flooding of the development, or caused by the development.

In accordance with the DEHLG guidelines "The Planning System and Flood Risk Management", where the development falls within Flood Zones A or B, the appropriate assessments and submissions shall be made, having regard to the vulnerability and proposed use of the property.

Only developments consistent with the overall policy and technical approaches set out in the DEHLG guidelines "The Planning System and Flood Risk Management" will be acceptable.

Existing and Proposed Building Floor Levels, Basements and Ground Floors to Ordnance Datum are to be submitted for all developments.

Minimum Floor levels in the City Centre shall be not less than 3.1m OD (Malin Head).

Minimum Floor levels in the South Docklands Area shall be not less than 3.5m OD (Malin Head).

Minimum Floor levels in the City Centre shall be not less than 3.1m OD (Malin Head)

5.19 Macerators

No under-sink or other type of food macerators/grinders for processing and discharging waste food to the drainage system shall be installed.

5.20 Grease Traps

All wastewater from commercial food preparation areas shall drain to a suitable grease trap, designed in accordance with BS EN 1825, prior to discharge to the public sewerage. Full details of the grease trap, including details of the proposed maintenance regime, shall be submitted to and agreed with the Drainage Section. Details shall include design loading of grease trap and grease trap capacity.

5.21 Petrol Interceptors

Where there is a risk of hydrocarbon contamination of the receiving water body, all storm runoff from all paved areas shall drain to a suitable petrol interceptor, designed in accordance with BS 858-2:2003, prior to discharge to the receiving water body. Full details of the petrol interceptor, including details of the proposed maintenance regime, shall be submitted to and agreed with the Drainage Section.

5.22 Protection of Public sewers

Where it is proposed to pile or use grout in carrying out development work adjacent to existing public sewers, A CCTV survey of the public sewerage in the vicinity of the proposed development shall be undertaken prior to commencement and again on completion. The scope of the surveys shall be agreed in advance with the Drainage Section. The results of the surveys shall be submitted to the Drainage Section; and the Drainage Section is to be notified prior to the commencement of piling or grouting operations.

5.23 Excavation Dewatering

No water from any excavation dewatering works shall be permitted to discharge to the public sewerage without the prior written consent of the Drainage Section.

5.24 Completion

On completion of the works, all sewers, drains and manholes shall be cleaned and freed of obstructions. A CCTV survey of the sewers and manholes shall be undertaken and the results of which shall be submitted to the Drainage Section for approval. These results shall be presented in a written report and on a DVD.

"As Constructed" drawings, in agreed electronic format and in hard copy, showing full details of the drainage system shall be submitted to the Drainage Section. All dimensions on drawings shall be in metric units and all levels shown on drawings shall be to Ordnance Datum (Malin Head). Digital drawings shall be to national grid co-ordinates.

5.25 DRAINAGE INFORMATION REQUIRED ON COMPLETION	
INFORMATION REQUIRED	NOTES
<u>As-built site plan showing:</u> 1. Site Boundary 2. Roads 3. Existing and proposed sewers, drains and rising mains 4. Details of connections to public sewers or waterways	a) All drawings to be supplied electronically and in hard copy. b) Manholes must have a suitable numbering system consistent with the CCTV survey. c) Digital drawings shall be to national grid co-ordinates.
<u>Longitudinal sections (sewers & rising mains) showing:</u> 1. Levels, gradients & chainages 2. Cover & Invert levels 3. Pipe material 4. Pipe diameter	a) All drawings to be supplied electronically and in hard copy. b) All levels must be relative to ordnance survey datum (Malin Head)
<u>Construction details and specifications</u> 1. Full details and specifications of all components of drainage system.	
<u>Copies of hydraulic design calculations for:</u> 1. Foul water (including trade effluents) 2. Surface water (including details of SUDs elements used)	a) All drainage design parameters used to be included. b) Including design calculations for any ancillary components used (e.g. Attenuation tanks, Pumps, Permeable pavements, soakaways, Infiltration trenches, Hydro-brakes, Grease traps, Petrol interceptors etc).
<u>Testing results including:</u> 1. CCTV survey & written report 2. Test certificates 3. Collateral Warranty from Consulting Engineer in Private Practice in respect of Design and Construction of sewer collection system. Consultant to have minimum Professional Indemnity Cover for a sum of €1.3m for each and every claim.	a) Manholes must have a suitable numbering system consistent with the as built drawings.
<u>Further information may be required, if applicable, in relation to:</u> 1. Pumping stations 2. Wayleaves 3. Land transfer & Ownership 4. Compliance with planning conditions (drainage) 5. Construction details and specifications	a) To expedite the process, the applicant should satisfy himself or herself that full details relating to drainage have been submitted.
<u>Contact details of a relevant person who will arrange access to the development and all manholes:</u>	
<u>Notes:</u> • The Drainage section will not inspect any development where as-built drawings are not acceptable or where a preliminary inspection of the site reveals deficiencies in the as built drawings. • If a development has previously been inspected by drainage then we will require details of works carried out on foot of the previous report.	

5.26 Guide for Storm Water Connection

1. How do I apply for a Storm Water Connection?

You must complete an application form for a Storm Water Connection. You must also complete an application form for a Road Opening Licence. These forms can be obtained from:

- a) Cork City Council website
www.corkcity.ie
- b) Water Service Section
Tel: 021 4924178
- c) Reception Desk
City Hall
Cork.

2. Is there more than one type of Storm Water Connection?

Yes

- (a) You may connect directly into the main Storm Water with a saddle connection. Cork City Council will carry out this type of Storm Water Connection
- (b) You may make your own arrangements with a contractor to connect into a public manhole. You must receive approval from the Water Services Section before any work/connection can be carried out on a public manhole.
- (c) A new manhole may be required on the main in certain circumstances. Approval for same must be sought from the Water Services Section.

3. How do I know the type of Storm Water Connection I require?

You may contact a Technician at (021) 4924280 for details.

4. Is there a cost for a Storm Water Connection?

For connecting into the main Storm Water [(a) above] the schedule of charges is as

Working Hrs	Fee
Mon-Thurs 9am-5pm Fri 9am-3.30pm	€235
Outside the above hours	€470

4. Is there a cost for a Storm Water Connection? (Continued)

If you connect into a manhole or create a new manhole [referred to in (b) and (c)]: The connection will be inspected by Cork City Council on completion.

Working Hours	Inspection Fee
Mon-Thurs 9am-5pm Fri 9am-3.30pm	€235

5. What work do I need to do?

Connection into the main Storm Water [referred to in (a)]:

It is your responsibility to expose the storm water main prior to the arrival of Cork City Council staff.

You must also lay a connecting pipe to the public storm water and provide suitable saddle fittings.

6. Are there any other additional charges that may occur?

A Road Opening Licence will be required for all excavations of the public ground. There is an additional charge for this. The guidelines for obtaining a Road Opening Licence are attached.

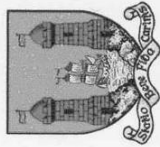
7. How do I find out the location of the Storm Water Main?

You can arrange an appointment to view the record drawings by contacting our technician at Tel: 021 – 4924280.

8. What happens when I complete the application form?

You can return the completed application form for a Storm Water Connection, the relevant application form for a Road Opening Licence and the fees to the Reception Desk, City Hall or post to the Water Services Section, City Hall, Cork. Your application form for a Road Opening Licence will then be forwarded to the Roads Control Division who will contact you re: same in due course. Work will not be carried out until a Road Opening licence has been obtained.

NOTE: An application form for a Storm Water Connection will not be accepted unless an application for a Road Opening licence is attached.
IMPORTANT: Completed Forms must be lodged at least 3 weeks before the works are required. Applications that require a road excavation of 5m² and over must be lodged at least 8 weeks before the works are required.



COMHAIRLE
CATHRACH CHORCAÍ
CORK CITY COUNCIL

GUIDE TO A STORM WATER CONNECTION

City Hall, Cork.
Website : www.corkcity.ie

9. How will I know when the work will be carried out?

Once you have obtained a Road Opening Licence, you will receive written confirmation from the Water Services Section of the date & time of when the Storm Water Connection will be carried out.

10. What happens when the Storm Water Connection is completed?

It is the applicant's responsibility to permanently reinstate the road that was excavated to the satisfaction of Cork City Council.

Useful Telephone Numbers

Water Services Section
City Hall
Cork

Tel: 021 4924178

Water Services Technicians Office (Drainage)

City Hall
Cork

Tel: 021 4924280

Roads Control Division

City Hall
Cork

Tel: 021 4924277

Planning Department

Navigation House

Albert Quay
Cork

Tel: 021 4924086

5.27 Guide for Sewer / Manhole Connection

1. How do I apply for a Sewer/Manhole Connection?

You must complete an application form for a Sewer/Manhole Connection. You must also complete an application form for a Road Opening Licence. These forms can be obtained from:

a) Cork City Council website

www.corkcity.ie

b) Water Service Section

Tel: 021 4924178

c) Reception Desk

City Hall

Cork.

2. Is there more than one type of Sewer Connection?

Yes.

- (a) You may connect directly into the main sewer with a saddle connection. Cork City Council will carry out this type of sewer connection.
- (b) You may make your own arrangements with a contractor to connect into a public manhole. You must receive approval from the Water Services Section before any work/ connection can be carried out on a public manhole.
- (c) A new manhole may be required on the main in certain circumstances. Approval for same must be sought from the Water Services Section.

3. How do I know the type of sewer connection I require?

You may contact a Technician at (021) 4924280 for details.

4. Is there a cost for a Sewer Connection?

For connecting into the main sewer [(a) above], the schedule of charges is as follows

Working Hrs	Fee
Mon-Thurs 9am-5pm Fri 9am-3.30pm	€235
Outside the above hours	€235

4. Is there a cost for a Sewer Connection? (Continued)

If you connect into a manhole or create a new manhole [referred to in (b) & (c)]: The connection will be inspected by Cork City Council on completion.

Working Hours	Inspection Fee
Mon-Thurs 9am-5pm Fri 9am-3.30pm	€235

An inspection fee for a public sewer diversion is €330.

5. What work do I need to do?

Connection into the main sewer [referred to in (a)]:

It is your responsibility to expose the sewer mains prior to the arrival of Cork City Council staff.

You must also lay a connecting pipe to the public sewer and provide suitable saddle fittings.

6. Are there any other additional charges that may occur?

A Road Opening Licence will be required for all excavations of the public ground. There is an additional charge for this. The guidelines for obtaining a Road Opening Licence are attached.

7. How do I find out the location of the sewer mains?

You can arrange an appointment to view the record drawings by contacting our Technician at (021) 4924280.



COMHAIRLE
CATHRACH CHORCAÍ
CORK CITY COUNCIL

GUIDE TO A SEWER/MANHOLE CONNECTION

City Hall, Cork.
Website : www.corkcity.ie

8. *What happens when I complete the application form?*

You can return the completed application form for a Sewer/Manhole Connection, the relevant application form for a Road Opening Licence and the fees to the Reception Desk, City Hall or post to the Water Services Section, City Hall, Cork. Your application form for a Road Opening Licence will be forwarded to the Roads Control Division who will contact you re: same in due course. Work will not be carried out until a Road Opening licence has been obtained.

NOTE: Your application for a Sewer/Manhole Connection will not be accepted unless an application for a Road Opening Licence is attached.

IMPORTANT Completed Forms must be lodged at least 3 weeks before the works are required. Applications that require a road excavation of 5m² and over must be lodged at least 8 weeks before the works are required.

9. *How will I know when the work will be carried out?*

Once you have obtained a Road Opening Licence, you will receive written confirmation from the Water Services Section of the date & time of when the sewer connection will be carried out.

10. *What happens when the sewer connection is completed?*

It is the applicant's responsibility to permanently reinstate the road that was excavated to the satisfaction of Cork City Council.

Useful Telephone Numbers

Water Service Section
City Hall
Cork

Tel: 021 4924178

Water Services Technicians Office (Drainage)

City Hall

Cork

Tel: 021 4924280

Roads Control Division

City Hall

Cork

021 4924277

Planning Department

City Hall

Cork

021 4924086

Section 6: Water Supply

6.1 Pipe Types

All mains 100mm diameter and above shall be in cement mortar lined ductile iron pipes to BS EN 545 and shall conform to Class K9. Ductile iron fittings shall be Class K9. Gasket shall be EPDM type.

All ductile iron pipe work shall be coated internally with a centrifugally applied cement mortar lining containing sulphate resistant cement and shall be sealed with an approved bitumen or epoxy resin seal coat in accordance with BS 4722: 1988. External protection shall include a zinc coating to EN 545 under bitumen based coating to BS 3416: 1991.

Where less than 100mm diameter the following are permitted;

- Service pipe Polyethylene pipe, type 32, heavy gauge, to the requirements of IS 134.
- Service pipe Polyethylene pipe, type 50, to the requirements of IS 135.
- 63mm MDPE PE80 / HDPE PE100)

Where written approval is obtained from the Water Department Cork City Council alternative pipe types may be permitted. They shall be installed to the standards approved by the Water Department.

Where alternative approved mains and plastic mains are installed a stainless steel tracer wire approved by the City Council shall be installed and tested to ensure the location of the main can be identified. The tracer wire shall be connected to the fittings and accessible for connection.

In contaminated ground the protection type and materials shall be agreed in writing with the City Council Water Department.

MDPE water pipes shall be light blue in colour.

HDPE water pipes shall dark blue in colour.

MDPE pipes should be of type PE-80 and have an SDR rating of 11. They shall conform to UK Water Industry Specification No. 4-32-17.

MDPE and HPPE service pipes and fittings shall conform to

UK WIS 4-32-17 for pipes

UK WIS 4-32-15 for fittings

UK WIS 4-32-14 for electro fusion fittings.

Where alternative materials (other than ductile iron) are approved for use training of City Council personnel shall be provided to the satisfaction of the City Council for the on going maintenance and repair regardless of whether or not the water main is to be maintained by the City Council.

The cost of this training shall be borne by the developer.

6.2 Service Pipes

As a general rule, service pipes should be
Polyethylene pipe, type 32, heavy gauge, to the requirements of IS 134.
Polyethylene pipe, type 50, to the requirements of IS 135.
MDPE.

In certain circumstances and, subject to prior written approval from the City Council Water Services Department, malleable copper pipes and/or copper alloy fittings may be used.

All pipe joints, fittings and accessories shall be lead less. (free from lead)

MDPE and HPPE service pipes and fittings shall conform to
UK WIS 4-32-17 for pipes
UK WIS 4-32-15 for fittings
UK WIS 4-32-14 for electro fusion fittings.

The diameter of the service pipe and all pipes & fittings must be approved in advance by the Water Department.

Services pipes shall be laid typically 600mm below finished ground level.

Where the service pipe can not be installed at the minimum 600mm from the finished ground level measures shall be put in place to protect from freezing and possible loading damage. This shall be highlighted in the as-built drawings.

The City Council Water Department reserves the right to require service pipes to be ducted.

6.3 Pipe Cover and Clearance

Water mains shall be laid so that they have a minimum depth of cover of 0.9m over barrel of pipe.

In green areas with no traffic loadings the minimum depth of cover can be reduced to 750mm over the barrel of the pipe.

Maximum depth 1.2m over the barrel of the pipe.

The laying of water mains outside this range requires written approval from the City Council Water Department

The pipes shall also have a minimum lateral clearance of 300 mm from underground services such as E.S.B., Multi-channel, Eircom etc. cables, junction boxes and inspection pits, underground transformers, gas mains, sewers and manholes.

Where a proposed water main trench lies within a 45 degree angle of support from the foundation of a structure a revised route shall be found.

In the event of no alternative route proposals are available the developer shall submit to the water department details showing additional permanent support to the structure to ensure maintenance can be carried out to the main at a future date.

The area for working space shall be included in determining whether it is within the structure support zone.

Pipes/ducts, cabinets, poles, junction boxes, railing, barriers or chambers shall not be constructed on top of a water main.

6.4 Pipe Bedding – Surround – Backfill

Minimum trench width, bed & surround and backfilling shall be as per **WS - 002 Untrafficked Areas and WS – 003 Trafficked Areas**.

Backfilling shall be carried out in compliance with the NRA Specification for Road Works. The approval of the water department is required to install a main at less than the minimum depth.

Where minimum cover cannot be achieved contact the City Council Water Department for the appropriate measures to be agreed.

At no stage should the water main be encased in concrete without the pipe being wrapped to break the bond to the pipe. Service connections shall not be encased in concrete.

6.5 Pipe Joints

Pipe Joints shall be formed by an approved method recommended by the pipe manufacturer. Rubber sealing rings, where used, shall comply with B.S. 2494, Part 1. Lubricants shall contain a sterilizing agent effective against bacterial contamination.

Where treaded bolts are used they shall be wrapped in denso tape to protect them from damage.

6.6 Thrust blocks

This section is covered by B.S. 6700 Anchors and Thrust blocks. Concrete thrust blocks shall be provided on water mains at dead ends, tees, bends of greater curvature than 22½ degrees curvature or greater and at both sides of a sluice valve chamber. Anchor block arrangements for lengths of pipes greater than 100 metres on level, sloping ground and crossing bridges shall be submitted.

Typical thrust block details are shown in **WS - 004 Typical Thrust Block Details** and Anchor blocks shall be provided on side slope and cutting, typical anchor blocks are shown in **WS - 005 Typical Anchor Block Details**.

These details and sizes shall be checked prior to use to ensure they are suitable to their proposed use as pressures and ground conditions vary from site to site.

6.7 Location for Mains

Water mains shall be laid as far as possible in the footways. If they are to be located on the roadway they shall 1 metre from the road edge.

The location of the water main in relation all other services, structures & obstructions for a particular development shall be shown on plan and cross sections with clearance dimensions clearly shown.

This information shall be provided at planning stage.

No planting or obstructions shall be on or within the working zone for the future repair of the main.

No pipe, cable, conduit, or other service should be laid longitudinally over the line of a water main.

6.8 Mains Layout

Water main layouts shall be arranged as far as possible in loops so as to avoid "dead ends" or terminal points.

Where there is the possibility of connecting into or extending the water main network into adjoining land that is not developed the pipe work shall be extended to the boundary once agreed with the water department.

Where terminal points are unavoidable hydrants shall be provided for flushing purposes. In addition where these terminal points are high points or any other high point in a water main the water department shall be consulted as to whether or not air valves are required.

Pressure reducing valves (PRV) may be required to reduce high water pressures in certain areas. Where possible there need shall be determined in advance but in some cases the Local authority may require these to be install after the main is made live. The cost of this work shall be borne by the developer. The need for PRV's shall be agreed with the Water Network section of Cork City Council.

Individual service connections shall not be taken across roads and their length kept to a minimum.

The water main layout shall be agreed with the Water Department before any site work commences.

The order of priority for providing a looped network layout shall be

- (i) connect the new layout into another existing water main network
- (ii) connect back on to another branch of the new network to form the loop
- (iii) provide a loop back on to itself as large as the space available will allow
- (iv) at locations of minimum width provide a hydrant at the end of the line with a minimum of 3 metres beyond the last connection.

Distribution mains shall be laid in common areas and not through individual private gardens or driveways etc.

The developer shall ascertain that the flow and pressure at the critical points within the development shall meet the minimum requirements of the fire department Cork City Council prior to commencement on site.

Any redundant water services shall be traced back to the public main by the developer and shall be blanked off by Cork City Council at the developer's expense.

Any existing lead services pipes to the site shall be replaced / made redundant at no cost to the local authority. This work shall be carried out to the satisfaction of the water department Cork City Council.

Way Leaves

Where a water main serving a development is in land of private ownership and the main is to be maintained by the water department a way leave is required.

Typically way leave are as follows but shall be agreed in writing in advance on an individual bases

- Details of any way leave shall be agreed with Water, Property and the Law Department of Cork City Council.
- 6 metres wide over the water main(s) shall be transferred by the Developers to the Cork City Council.

- There shall be no structure constructed within 3 metres of the water main.
- Any structure shall not be undermined by the excavation of the water main

6.9 Test Pressure

All new mains shall withstand a pressure test of at least 1½ times the maximum working pressure or 100 metres head, whichever is greater, carried out by using the water pressure test.

The minimum test pressure shall be 10 bar unless otherwise advised.

The test shall be maintained for a period of 24 hours and shall be considered successful if the amount of water required to restore the test pressure is less than 0.11 litres per mm of nominal pipe diameter, per kilometre of length, per 24 hours.

The pressure test shall be witnessed by a member of Cork City Council Water Department.

Where possible the joints of the water main shall remain exposed for inspection during the test, sufficient material shall be placed over the centre of the pipe to prevent movement under the test pressure.

The complete pipe network shall be tested together or in sections. The length of section to be tested will depend on;

- (a) the availability of suitable water
- (b) the number of joints to be inspected
- (c) the difference in elevation between one part of the pipeline and another

Testing is not permitted against a live sluice valve. Where possible testing shall be carried out against blank ends that are adequately secured and supported.

Before testing begins all valves shall be checked to ensure the full section is being tested, the sections of main filled with water and the air released. Testing shall be carried out at the lowest point unless otherwise approved by the water department.

On completion all pipes shall be flushed out and sterilised in the manner described in Clause 6.10 below.

It is recommended that an air test be carried out daily where long lengths of water main are being laid to avoid costly searching for leaks at a later stage. A successful water pressure test shall be required prior to commissioning / connection).

6.10 Disinfection of Mains

Mains greater than 10m in length;

On completion of the pipe network they shall be thoroughly cleaned by swabbing to ensure that no foreign matter remains inside the pipeline. Any section which cannot be effectively swabbed shall be thoroughly cleaned by jetting at pressure that will not cause damage to pipeline.

The main shall be filled with clean water and a chlorous sterilising agent shall be introduced into the main at a minimum concentration 20mg/l of free available chlorine. The contact time shall be not less than 24 hours. A sample shall be taken and tested by an approved laboratory to ensure there is a free chlorine residual of at least 10 mg/l at the furthestmost end from the point of injection. If less than 10mg/l the test shall be repeated. The dechlorination / disposal of the residual chlorine shall be carried out in an approved manner

to ensure not damage is caused by shock loading of the sewer or watercourse. The approval of the drainage department shall be sought for discharges to sewers.

The main shall then be flushed with normal potable water. It shall be refilled and left stand for 24 hours. A sample shall be taken and tested for Bacteriological Analysis by an approved laboratory.

Care shall be taken when obtaining the sample for testing and only sterile containers shall be used.

Samples shall be tested within 6 hours of collection. If the results are not satisfactory the sterilisation procedure and bacteriological testing shall be repeated.

Copies of both the chlorine and bacteriological successful test results shall be submitted to the water department prior to connection being made.

Mains less than 10m in length;

The main shall be swabbed and then disinfected with solution containing 1000 mg/l free chlorine.

The main shall be flushed until clear.

6.11 Valves

Sluice valves shall be clockwise opening (ANTI CLOCKWISE CLOSING).

They shall be located in footways if possible and the depth of the spindle below ground level shall be between 300 mm and 600 mm. Extension spindles shall be installed if required to achieve the correct height.

Sluice valves shall be installed on each leg of a "T" to keep the areas for shut downs to a minimum.

Gate valves shall comply in accordance with BS 5163-1(2004), BS 5163-2(2004), BS EN 1074-1, BS EN 1074-2, or equivalent E.U. specifications with nominal pressure designation PN 16.

The number of turns to open/close the valve must be $n=2N+1$ where N = the equivalent diameter in inches.

The valve shall be designed for maximum permissible working pressure of 16 bar at ambient temperature.

The valve shall be marked by an arrow, cast on, to indicate the direction of opening. The valves are required to OPEN in the CLOCKWISE direction.

Flanges to be in accordance with PN16.

The valve shall be Type B, resilient seated.

Coating should be suitable for use with potable water and W.R.C. listed.

6.12 Hydrants

Hydrant Type

The hydrants shall be manufactured in accordance with BS 750:2006 Type 2, screw down shallow pattern.

The detachable hydrant head shall be of the instantaneous type.

Inlets shall be 80mm diameter with PN 16 or PN 25 flanges.

The general design of the hydrant and the materials used in the various parts of it shall be such as will reduce to the minimum the danger of deterioration of the metals.

The hydrant shall have a frost protection mechanism

The hydrants are required to OPEN in the ANTICLOCKWISE direction.

Outlet points of hydrants shall be between 200 and 300mm below the surface of the ground in which they are located.

Location of Hydrants

As far as possible hydrants shall be located in the footpaths or grass margins adjoining the roadway and near the kerb. Hydrants located in a grass margin or other grassed area shall be paved in concrete 100mm thick for a distance of 300mm from the periphery of the cover box.

The cover shall be set slightly above the surrounding grassed surface and the concrete surround shall be "weathered" to prevent surface water entering the hydrant pit.

The location of hydrants shall be such as to permit easy access for fire appliances without creating an obstruction for other vehicles. Hydrants shall be located within 30 metres of a hard-standing suitable for fire vehicles.

Spacing of Hydrants

Hydrants shall be not more than 90 metres apart and at least one hydrant shall be within 60 metres of any part of any dwelling as measured by straight line on plan.

Note the Building Regulations require a higher standard for large buildings which include 46 metres from any part of a building plus minimum of 6 metres from the building.

The Fire Service must be contacted in relation to the requirements for Fire Fighting Hydrants in addition to the hydrants required by the Water Department.

The developer shall ascertain that the flow and pressure at the critical points within the development shall meet the minimum requirements of the fire department Cork City Council prior to commencement on site.

6.13 Indicator Marker Plates and Posts

Marker Plates shall be located in line (where possible) and facing the fitting they are identifying.

Hydrant marker plates showing size of main and distance from hydrant shall be fixed on walls directly opposite the hydrant served at a height of not less than 1 m and not more than 2 m - the higher limit is desirable where circumstances permit.

Where walls are not available for hydrant or valve, marker plates shall be fixed on purpose-made concrete posts at a height of at least 600 mm above ground level as per **WS – 001** concrete posts shall comply with I.S. 162.

Hydrant Indicator plates shall have fixed black letters complying with B.S. 3251, the plate background shall be yellow.

Sluice valves, Air valves, Meters and Scour valves shall be located by marker plates as per **WS - 001**. The letters A.V., S.V., M and Sc.V. to be fixed black letters and plate background shall be white.

6.14 Chambers

Approval shall be sought prior to use of preformed chambers, full details to be submitted to the Water Department.

Chambers for sluice valves, fire hydrants and air valves shall be constructed in accordance with drawing marked **WS – 006 to 011**.

Frames and Covers shall be to BS EN124, loading Class D400. The cover shall be marked with the appropriate cast-in lettering on anti skid top. Kite marked to EN124-D400

Fire Hydrant Surface box to B.S. 750 (EN124) with heavy duty Grade A Ductile Iron drop lid and chisel lifting slots, with cast-in lettering "H" on anti-skid top. A holding chain shall be secured by a non-tamper connection to the frame and cover. Frame ope shall be 445 x 280mm. Kite marked to EN124-D400.

Both the Sluice Valve and Air Valve box shall be fitted with heavy duty drop in lip with cast-in lettering "S.V." or "A.V." on lid. Frame ope shall be 445 x 280mm. Kite marked to EN124-D400.

Where there is insufficient space to provide the rectangular 450x300 size cover the lighthouse pattern with internal cast bayonet locks will be permitted. Covers shall have minimum 100mm clear opening. Depth shall be 150 mm with a min. bottom flange plate of 25 mm wide for bedding on chamber walls. Cover shall be chained and shall be heavy duty as per B.S.1426 and B.S.3461. (EN 124)

6.15 Service Connections

Each dwelling shall be provided with its own separate service pipe from the main. The service shall be controlled by a boundary box (type specified / approved by Water Department) at a depth of 600 mm . The box shall be suitable for meter installation. It shall be located on the inner side of the public footpath and close to the entrance to the dwelling, typically within 1m of the site boundary.

Joint service supplies are not permitted.

Push home type fittings are not permitted for tapings and small services connections.

All fittings and materials shall be approved by the Water Department prior to use.

Any existing lead services pipes to the site shall be replaced / made redundant at no cost to the local authority. This work shall be carried out to the satisfaction of the Water Department Cork City Council.

Each apartment shall be provided with its own separate service pipe. The service shall be controlled from a Boundary Manifold Box (type specified / approved by Water Department), and located on the inner edge of the public footpath and close to the entrance to the apartments, typically within 1m of the site boundary.

Sizes of service pipes shall be agreed with the Water Department. Typically standard dwelling connections are 12mm diameter except in exceptional circumstances (i.e. long connections, steep gradients, water demand)

Boundary box and stub for service shall be installed in line and at 90 degree angle to the building to be supplied and marked on the as-built drawings.

Note: In line with EU Directives, lead services and lead-lined tanks shall not be used. Where an existing property is being renovated / altered any existing lead services and lead lined tanks shall be replaced.

Every service pipe shall be fitted with a "stop valve" inside the house to B.S. 1010 and as near as practicable to the point where the pipe enters the building. The pipe shall be laid through a duct where it passes through the outside wall allowing adequate clearance.

The various water connections shall be agreed with the Cork City Council Water Department before work commences.

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6.16 Boundary Boxes

Boundary boxes shall be in compliance with BS EN ISO 9001:2000 and shall comply with the "Water Industry Specification for Boundary Boxes for Metering and Control of Domestic and Small Industrial Services" No. 4-37-01

- The meter boundary box should be WRC approved type plus
- Have integrated stopcock and be supplied with a stopcock key in compliance with BS 1010
- Have gunmetal castings located at the bottom of the chamber
- Have a non-return valve positioned under the meter / transponders
- Should be fitted with a spacer / screw in fitting in the absence of a meter as agreed with the water department.
- Should be suitable for all volumetric type $\frac{1}{2}$ " or $\frac{3}{4}$ " meters
- Should be suitable to take a data logger if required
- The stopcock handle shall be within reach at ground level, typically 300-450mm with frost protection insert under cover
- The cover and frame to be Grade A (Heavy duty)
- Hinged Covers; Hinge pins shall be made from steel and shall not be less than 10mm in diameter. The lids shall be fitted to open to the full designed extent and shall close on the seating without strain on the hinge pin.
- Drainage and skid-resistance: Covers shall be self-draining and have a raised pattern such as chequers, so as to provide a skid-resistant surface.
- Marking on the cover shall be clearly marked by having the word "UISCE" in letters not less than 20mm high cast into the cover. Also in addition, shall have clearly cast thereon the number of IS 261: 1984 and the appropriate grade on the flange face of the body of the stopcock cover.

Details of proposed manifold units shall be submitted in advance for written approval from the Water Department prior to installation. (A sample with data sheets shall be submitted prior to approval)

Boundary box to be approved by Water Department before work commences. (A sample with data sheets shall be submitted prior to approval)

The location of the Boundary Boxes are to marked on the as-built drawings.

6.17 Storage

All dwellings shall have one day's storage in cold water storage tanks, minimum capacity measured from the top water level to the draw-off point.

The storage capacity shall be the maximum total water usage for 24 hrs excluding fire fighting needs and shall not be less than the minimum set out in the table below.

The fire fighting needs shall be agreed with the Fire Department.

Building or Use	Minimum Cold Water Storage for new developments using low flush and dual flush WCs
Dwelling house or Apt. (up to 3 Bedrooms)	230 litres / 50 gal
Dwelling house or Apt. (4 Bedrooms or single power shower)	340 litres / 75 gal
Additional water storage per shower en-suite in the above.	90 litres / 20 gal
Factory (staff use)	45 litres per each member of staff
Offices and Shops	45 litres per member of staff
Restaurants and canteens	7 litres per meal

Storage tanks shall be so placed that the interior thereof can be readily inspected and cleansed and no such tank shall be so placed and equipped that the water therein is liable to contamination.

Storage tanks shall be fitted with covers sufficiently tight fitting to prevent the ingress of vermin or other contaminating material.

Storage for developments shall be certified in writing for compliance with the minimum requirements and regulations.

The installation of dry riser pipes to enable storage tanks to be filled at times of emergencies with no public water supply.

This shall apply to critical institutions, public buildings, schools, hospitals, old folks home etc.

Consideration shall also be given to commercial development where lack of water supply would restrict their business.

Dry riser pipe work (inlets and outlets) shall be clearly marked.

6.18 Internal Plumbing

Internal plumbing systems shall comply with the building regulations.

A stopcock shall be installed where the cold water supply enters each premises therefore 2 shut off points are provided. (One in the public area and the second within the private area.)

Dwelling Houses

The cold water supply to the kitchen sink should be taken directly from the service pipe supplying water to the dwelling; the cold water supply to the bath or shower and the washbasin and to other appliances in the dwelling should be from a cold water storage cistern.

All draw off points except water for consumption shall be supplied from storage. (examples of exemptions are ice machines, water cooler dispensers, fizzy drinks machines)

All drinking fountains and draw off points with water for consumption shall be fitted with a double check valve assembly or vacuum breaker in compliance to B.S. 6282 Part 1 and Part 3.

No fitting, apparatus or machine shall be plumbed in a manner which will create a risk of back-siphonage into the water supply system. All such equipment shall be provided with adequate safeguards to prevent any possibility of back-siphonage taking place.

All tanks shall be fed by a ball-cock to B.S. 1212, including storage tanks, expansion tanks and w.c. cisterns.

Ball valves shall be fitted in such a position that they discharge at a level higher than the level of the overflow pipes. The minimum gap requirement is 20 mm for pipe not exceeding 14 mm and 25 mm for the pipe not exceeding 19 mm. For pipes exceeding 19mm diameter the gap shall be twice the diameter of the overflow pipe.

Each WC suite installed in a newly constructed non-domestic premises or in a non-domestic premises converted from another use shall have a maximum flush of 6 litres using a multi flush or single flush facility.

Pipes and fittings inside buildings shall be protected against freezing and shall be surrounded with insulation material in accordance with B.S. 1334.

The internal plumbing for Commercial properties shall be designed to allow for sub division of units and the metering of same. Prior to alteration of a premises the developer / owner shall agree with the metering section of the City Council Water Department a revised metering proposal for the premises.

Pressure Boosting

The water supply to a property may require pressure boosting depending on its location and if it is greater than 2 stories in height. The developer / owners / agents shall determine if pressure boosting is required at a particular location and notify the City Council Water Department of its finding in writing.

If required the following conditions shall apply.

- (a) Valved connections off the public supply shall be split into break- tanks, one for drinking water and one for general purpose water prior to storage for each of the latter. Otherwise a single tank suitable for the storage of potable drinking water will be required.
- (b) The effective capacity of the break tank(s) shall be based on the total water storage requirements and the location within the building but should not be less than 15 minutes pump output.
- (c) Break tanks should be located in a clean lockable area where they are not subject to contamination.
- (d) Break tanks shall be suitable sealed and suitably insulated against heat and frost so that the water temperature will not exceed 20 degrees Centigrade. Tanks must be capable of being accessed for maintenance and cleaning. All venting and access opes to tanks to be above 4.1 m ordinance datum.
- (e) Tanks should be designed to be desludgable.
- (g) The water system shall contain an adequate device or devices to prevent the occurrence of back flow or back siphonage.

6.19 Responsibility for Water Mains and Pipes

New developments are the responsibility of the developer until the development is taken in charge by the City Council.

The following applies where the City Council has taken the development in charge before 2008.

(a) Domestic Consumers.

The City Council is responsible for the water main in the street and for the pipe that connects it to the stopcock. The pipe work from the dwelling to and including the stopcock is the responsibility of the owner or occupier.

Where the pipe work supplies more than one property, responsibility for repair is shared by all customers who get their water from the pipe.

(b) Non-Domestic Consumers.

The City Council is responsible for the water main in the street. The pipe work from the main to the premises is the responsibility of the customer.

The following applies where the Council has taken the development in charge after 1/1/2008.

(a) Domestic & Non Domestic Consumers.

The City Council is responsible for the water main in the street and for the service pipe that connects property up to the curtilage of the property it serves, including the stopcock / meter box. The pipe work within the property out the curtilage of the property is the responsibility of the owner / occupier.

The City Council does not take in charge the pipe work that supplies more than one property within a private property curtilage. The responsibility for its repair is shared by all customers who get their water from the pipe.

(b) Non-Domestic Consumers.

In addition to (a) above the City Council is responsible for the maintenance and repair of the water meter.

6.20 Drawings

"As-Constructed" Drawings, showing details and location of all water mains, fittings, bends and location of all service pipe connections with boundary boxes and meters shall be submitted before estate can be taken in charge.

The drawings shall include

- (a) types / sizes of mains and service connections installed
- (b) depths of mains and service connections installed
- (c) names of new and existing roads
- (d) dwelling and building numbers
- (e) details of any services and structures in close proximity to the water distribution system including offset measurement to the water system.
- (f) The digital drawings shall be national grid co-ordinates in AutoCAD format clearly detailed to the satisfaction of the water department.

(g) Clearly mark the extent of the area to be taken in charge.

As-built records shall be submitted in both paper and digital format to the Water Department via the planning department prior to occupation of the premises or on completion of the development works, whichever occurs first.

Where works are being carried out in a phased basis an agreed method of submitting the as built records shall be submitted to the water department via the planning department. As a minimum updated drawings shall be submitted to the Water Department every 6 months or when new elements of a water main network have been made live.

The as-built records shall include full details of all elements of the water supply system and be in sufficient detail to operate and maintain the system at any point in the future should the local authority be required to do so.

The same minimum standards apply to developments that are not for taking in charge. Where the development is not being taken in charge a contact name, address and phone number of the person responsible for the development shall be submitted. It shall be updated should it change.

The water department reserves the right to request and receive additional proof that the records submitted are correct, any cost involved shall be at the owners / developers expense.

Taking in charge

Requests for taking in charge are carried out once the as-built records are fully submitted. A contact name and number shall be made available for a member of the construction team familiar with the site, particularly the water element, should any queries arise.

The following are some of the main checks which are carried out

- They are checked for compliance with planning
- Locations are as per drawing
- In working order
- Chambers are cleaned out
- The network is checked for leaks

Snag lists are prepared and returned for completion.

The developer returns a list of the work that has been carried out

When the developer has completed snag list it is then checked by the Local Authority. Should there be further work required to be completed a charge is applied for the cost to the water department.

Once complete the recommendation for the water element to be taken in charge is sent back.

The estate is not taken in charge until all departments have given their recommendation for taking in charge and a date set or approved by the Council members.

6.21 Metering of Water Supplies

The Water Department may require meters, transponders and loggers to be installed for any type of development.

Meters are typically used / installed for

- Charging for Non domestic water used
- Quantifying Residential element of mixed developments
- Monitoring water leakage

Non-Domestic Meters

The following shall apply to each commercial unit

- The metering arrangements shall be agreed with the City Council Water Department prior to commencement on site.
- a single water supply with an isolation valve, meter and transponder. Where a unit is permitted to have more than 1 supply in special circumstances it shall not inter connected with another supply and it shall have its own valves, meter and transponder.
- The meter location shall have suitable access to the approval of the Water Department
- A scaled map clearly showing the position of all existing / proposed meters for the property shall be submitted to the Water Department prior to development commencing.
- A metering proposal document shall be agreed with the Water Department prior to commencement on site where more than one user is involved. Details of the agreement shall be submitted to the planning authority for record purposes.
- Where more than one meter is required a set of drawings shall be submitted clearly showing the areas each meter serves. The same shall apply where the development involves changes to existing premises.
- Details of the agreements after planning is granted shall be submitted to the planning authority for record purposes.
- On completion a revised map shall be submitted with their final positions along with photographs of the meter location in relation to its surroundings
- Prior to occupation and departure of the premises the occupier shall inform the Water Department Metering Section of the any change in water user details for charging purposes.

The current position is Non Domestic Water Supplies are charged based on the amount of water used and billed quarterly. Larger users or any user may be bill more frequently; this is at the discretion of the Local Authority.

Domestic Meters

The charging for domestic supplies is currently being reviewed at National Level and therefore all supplies to residential premises shall be suitable for meter installation without alteration of the pipe work or excavation.

Residential units shall have meters installed for monitoring purposes or for measuring the residential element of a mixed development. The meters shall be approved and installed by Cork City Council Water Department. It shall be the responsibility of the developer to get written confirmation that domestic meters are not to be installed, from the City Council Water Department. The installation cost shall be borne by the developer. The conditions listed under the commercial metering shall apply to residential meters

Construction Sites shall have a metered supply to the satisfaction of Cork City Council Water Department. Meters shall be installed by the Water Department. A deposit shall be provided to ensure the meter is maintained and payments for water used are made.

Housing Estates

Depending on the size of housing estates a bulk leakage meter shall be installed. The meter shall be installed if the estate has more than 10 units and or the distribution main for the site is greater than 40m from the public main to further point on its distribution main.

The installation of bulk meters shall have bypass installed to the satisfaction of the Water Department.

All meters shall be supplied and installed by the City Council Water Department and or their agents to Cork City Council specification. The costs are borne by the developer in advance.

Meters are sized based on size of the pipe work and the amount of water used. The selection of the correct pipe size to serve the development's water needs is important to insure the correct meter is installed to accurately record the flow. Higher installation costs will be charged where the incorrect size water pipe is installed for the water demand and may result in the replacement of the water supply pipe.

Meter locations shall be on straight sections of pipe work. Typically the minimum length of straight pipe work before and after the meter shall be 10 times the diameter.

Meter locations are typically located with 1m outside the curtilage of the site and agreed with water department. When selecting the location the safety for future maintenance, repair and meter reading shall be taken into account.

All meter shall be installed in chambers of sufficient size for replacing the meter without excavation.

6.22 Use of Hydrants

The use of Cork City Council hydrants is controlled by license and is subject to an annual fee.

Each license contains conditions that must be adhered.

The license may be withdrawn without reimbursement if the licensee fails to comply with the terms and conditions

The use of a Hydrant without permission is an offence.

The user must give 48 hours advance notice to the Water Services section plus the local residents affected.

Notification to residents can be in the form of a leaflet drop and or signage erected in advance in the surrounding area.

There are areas where it may not be possible to use hydrants in that particular area.

The user / license holder must prove to the satisfaction of the Water Department that their use of the hydrant will not cause or likely to cause contamination of the water supply they are connected to.

6.23 General

Shut Downs and Valve Adjustments

The City Council Water Department Staff are responsible for the following:

- All shutdowns of water supplies to the public
- All valve adjustments on live mains

Applications for the following shall be made well in advance to the Water Services Offices, Room 315, City Hall, Cork.

- connections
- disconnections
- shut downs
- meter installations / alterations
- meter disconnections
- pressure and flow tests
- tracing of water services
- hydrant licenses
- other water related services

Proof of payment is required prior to work being carried out.

Branch Connections

All connections shall follow the following steps

- Agree layout and details with Water Department Technical staff
- Obtain quote for connection works
- Install water pipe work and fittings
- Agree connection date with both Roads and Water Dept. in sufficient time
- Clean, Pressure Test and Disinfect pipe work and fittings
- Submit successful test results, and proof of payment for connection prior to agreed date
- Carefully excavate around public main for connection crew
- Reinstate excavation to Roads Specification while protecting water main and fittings

Similar procedure applies for meter installation.

Work to or near Large / Trunk Main

Large trunk mains are critical elements of the water network and shut downs and alterations require detailed planning and organization.

Detailed method statements shall be submitted in advance and agreed with all parties involved. They shall detail who is responsible for each element, the plant, materials and resources need, alternative arrangements and backup plans, time frames for each of the stages involved.

Depending on the nature of the work involved the typical minimum advance notice is 8 weeks. Where agreement is not reached quickly the time frame will extend.

Water Department Permission

The use of other materials and fittings not specified in this document must have special written permission from the Water Department, Environment Directorate

Standard Details and Requirements

Water Engineering Requirements Version 31/03/10.

Standard details are listed in the document but these may be altered to suit changing circumstances therefore they can be obtained from the Environment Technicians office, City Hall to ensure that they are current at the time of use.

Similarly the detail in this document may change therefore the current version can be obtained from the Environment Technicians office, City Hall to ensure that they are current at the time of use. .

Section 7: Landscaping

FORWARD

All landscape proposals must be submitted to the Parks Department for consideration and approval. Planning applications for major schemes should include a detailed landscaping plan, (prepared by a competent Landscape Architect / Horticulturist) and a planting schedule which will aim to provide an attractive and varied environment. Proposals for the management of this open space should also be included for long term management.

The development of grass verges and open space shall be carried out in a satisfactory manner acceptable to the Parks Department in accordance with the following conditions:-

7.1 General

General landscape operations shall be executed in accordance with the recommendations of BS 4428 'General Landscape Operations (excluding hard areas)'.

7.2 Tree and Shrub Planting

Preparation for planting in grass verges and open spaces shall be carried out by the developer in accordance with approved landscape plan. Species, spacings and planting densities to be determined by the Parks Department. Tree and shrub planting shall normally be carried out between October and March inclusive. Evergreen trees are best moved when the ground is warm enough to encourage rapid root action in autumn or late spring.

7.3 Tree Planting

All tree works shall be carried out in accordance with BS 7370 Part 4: 1993 and B.S. 4428 Sections 7 and 8 and the following specifications.

Selected standard trees shall have a minimum girth of 16-18 cm , and a clear stem height of 1800mm above ground, with a total height 3.0 to 3.5 metres.

7.3.1 Protection of Trees

Planting can be carried out from November to March but prior to the planting the Contractor should notify the Supervising Officer of any dissatisfaction as to the condition of the supplied trees because of his/her responsibility under the Defects Liability (Para.6.) after planting.

On delivery to site, bare rooted species shall be heeled in with soil, which must be well firmed to avoid any air pockets around the roots.

Ball rooted trees should be placed side by side and the ball covered with moist sand or peat.

Tree roots must to be exposed to the elements for longer than 5 minutes. This may necessitate wrapping or covering the tree roots upon delivery, transporting to site and prior to planting.

7.3.2 Tree Pits

- Tree pits shall be excavated to a size so that no roots shall be bent or cut to accommodate the tree, and it should be approximately 75 mm deeper and wider than the area of the root system.
- Any sub-soil excavated should be removed from site and replaced with good quality topsoil.
- Any turf removed should be placed in the base of the pit and broken up along with the bottom of the pit, the sides of glazed should be roughened with a fork.

7.3.3 Planting

- Topsoil for back filling should have an approved fertilizer added and thoroughly mixed in.
- Cover the base of the pit with 50-75 mm of back-fill material.
- Cut back cleanly any damaged roots, position the tree in the centre of the pit, spread out roots.
- Position the tree stake and drive in, hold the tree up to the stake and work the backfill material around the roots while slightly shaking the tree.
- The backfilling should be firmed in layers by treading taking care not to damage the roots.
- Trees are to be planted to the same depth that they were growing in the nursery.
- Where trees are planted into mown turf a 600 mm diameter ring will be formed around the tree base.
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7.3.4. Specifications for Trees

Dimensions of Standard Trees

<i>Designation</i>	<i>Girth of stem 1m from ground level (cm)</i>	<i>Minimum overall height from ground level (m)</i>	<i>Clear stem height from ground level to lowest branches (m)</i>
Whip		1.2	
Feathered		1.8 – 2.1	Well furnished with lateral branches
Standard	8 – 10	2.75 – 3.0	1.8
Select standard	10 – 12	3.0 – 3.5	1.8
Heavy standard	18-25	3.6 – 4.3	1.8

Note: - The heads shall be well developed for its type and evenly balanced, with no main branch crossing the crown.

7.3.5. Staking and Tying

- Trees shall be secured to a straight, pointed round stake with a minimum 75 mm diameter.
- This should be driven 750 mm minimum below ground level prior to backfilling.
- The stake should be cut off just below the first branch on the tree, or for feathered trees the stake can be cut at 1.0 metre.
- Trees should be secured to the stakes using approved tree ties and spacers.
- Standard trees should have 1 tie at 25 mm from the top of the stake.
- Feathered trees should be secured with 1 tie at the top of its 1.0 metre stake.
- All ties should be fixed by nailing to the stake.
- Any damaged branches must be trimmed off cleanly with secateurs, to the main branch or the next live bud.

7.3.6 Root Balled Trees

- Following initial backfilling to the correct level, the tree shall be positioned in the centre of the pit and if it is to be supported by stakes these shall be driven in around the rootball.
- On no account shall the root wrapping of a balled semi-mature tree be removed.
- Backfill pit in layers as specified.

7.3.7 Securing the tree

Basic requirement – for at least the first three years after transplanting and until the tree's roots develop, it is necessary to provide support to anchor the root system securely. Newly planted trees must be held firmly although not rigidly to prevent a pocket forming around the stem and newly formed fibrous roots being broken by mechanical pulling as the tree rocks.

Trees shall be supported by a 2.4 m stake of larch, spruce or Douglas fir having a minimum diameter of 75mm at the light end and having the heavy end pointed to facilitate driving. Trees shall be secured to the stake by means of 8 gauge bull wire, through a ring of 12.5mm rubber hose to prevent damage to the bark, or an alternative approved tree tie. The diameter of the rubber ring to be 38mm greater than that of the tree to allow for expansion. Wire to be attached to the back of the stake by means of 38mm galvanised staples. Patent reinforced tree ties may be used instead.

On exposed sites, place the stake on the prevailing wind side of the tree, and on other sites, place the stake on the opposite side to the main viewpoint.

Where tree guards are necessary care should be taken to ensure that they do not impede natural movement or restrict growth. Type of tree guards used to be approved by The Parks Dept.

7.4. Shrub Planting

General

- All works specified in this section will be carried out in accordance with the current B.S. 7370 Part 4 1993 and the following specifications.

7.4.1 Preparation for Planting

- All weeds on the area must be cleared or sprayed by the application of an approved translocated non-soil acting herbicide.
- Topsoil shall be cultivated to a depth of 150 mm (250 mm for new schemes), using cultivators, rotovators or other approved equipment, and hand cultivation to the same standard will be carried out where machinery cannot be used.
- All rubbish weeds and roots along with any stones, bricks or other undesirable material over 25 mm diameter which are brought to the surface shall be collected and removed.

7.4.2 Planting

- Excavated holes shall be large enough to accommodate the root system when the roots are spread out. Non-perishable containers shall be removed and any damaged roots carefully pruned before planting.
- Each shrub will be planted to the same depth at which it was previously planted by placing it upright in the centre of the hole and backfilling with the soil carefully working it between the roots, the soil being properly firmed in a manner to avoid any damage to the root system or root ball.
- The plant should be set in the holes so that the soil level, after settlement, will be at the original soil mark on the stem of the plant. Planting holes should be about 15 cm wider than the root spread.
- Work some soil around the roots to settle the plant. Shake the plant gently to distribute the soil evenly and eliminate air pockets.
- Fill the hole to half its depth and firm by treading gently, avoiding damage to delicate roots.
- The remainder of the soil can be returned to the hole and again firm the plant in by treading. On completion of planting, the ground should be forked over and the plant well watered.

7.4.3 Mulching

- On replacement planting where mulch is present and on new schemes where specified medium grade bark mulch should be spread to a depth of 50 mm.

7.5 Green Areas

All finished gradients are to smooth flowing , marrying with all existing levels . Minor fillings and excavations shall be made to bring the grass and planting areas into running levels with paths and kerbs.

In general , areas less than 10 metres wide and areas to the side and rear of properties , ends of cul-de-sacs should not be provided as green areas because of difficulties with maintenance , inconvenience to residents and unsocial behavior and activities. Such areas have little or no amenity or recreational value to the residents or the estate.

Preparation, seeding and turfing shall be carried out in accordance with B.S. 7370 Part 4: 1993.

7.5.1 Seedbed Preparation

The top 300 mm of material (topsoil) should be excavated first and put to one side, the remaining material should then be excavated and placed on the other side. The reason for this separation is to ensure that the topsoil is not mixed with subsoil and other poor quality material is present.

Prior to the replacement of topsoil, subsoil should be ripped / scarify to a depth of 150 mm. This would include all areas where compaction may have occurred due to driving of / parking of vehicles on grassed surfaces (wheel ruts).

Large stones brought to the surface should be picked off and disposed of off site . Return subsoil and other material to the bottom of the excavation, using the topsoil for the remaining 300 mm.

Replacement of topsoil should not be carried out in wet conditions. After spreading the topsoil, the seed bed shall be prepared / cultivated by hand raking or harrowing with a spike or chain harrow on large areas and light and uniform rolling to produce a fine tilth. All surface stones and debris from 10 mm – 50 mm in any dimension shall be removed from the surface. Finished levels to have fullness under moderate consolidation, to an average of 25 mm above paths, kerbs and manholes.

7.5.2 Fertiliser Application (Turf and Seed)

- During the final preparation a base dressing of an approved granular fertiliser shall be applied at the manufacturer's recommended rates.

7.5.3 Sowing of Grass Seed

No grass seed shall be sown until the cultivation and preparatory works have been approved by the Parks Department.

Certified quality grass seed (amenity mixture No. 2) shall be used.

Sowing should be carried out during optimum temperature and rainfall conditions (usually March – October) and during suitable calm weather conditions, at a rate of 30 g / m².

The operation should be carried out in equal sowings in transverse directions. A specialised seed sowing machine will ensure higher establishment rates and will also ensure accurate and economical seed distribution.

After sowing the ground should be lightly raked and then firmed with a lightweight roller.

7.5.4 Sodding / Turfing

In situations where sodding or turfing is carried out, the exact same procedure should be adopted up to the seed sowing stage, except that the final level of the seed bed should be 50 mm (or the depth of the cut sod) below the finished level.

The sod should be cut with a straight edge, be uniform, approximately 50 mm deep and strong enough to hold during handling.

The seed bed receiving the sod should be cut with a clean edge to the exact same width as the sod, so that the two will marry in together.

Lay the sod in straight lines and do not try to bend them round to form curved edges, ensuring that each sod is as close as possible to the proceeding one.

Where the edges of the sod are not even and full, allow a 50 mm overlap and trim with a half moon (sharp edge) to achieve flush joining.

Tamp down gently each row of sod with a tamper made from thick boards and a pole. Check the level with a board and a spirit level if necessary, after tamping down.

If there are any bumps or hollows, the sod should not be heavily rolled and beaten down. The sod should be lifted and any irregularities corrected by adding or removing soil, as necessary.

Apply a sandy soil top dressing mixture between the crevices using either a broom or the back of a rake. This is essential in that it will help the sod knit together.

Grass seed should be sown over the disturbed areas where topsoil has been spread.

- 7.6. Manholes / Junction Box Covers etc.,** are to be laid slightly below (25 mm) the existing ground level

7.7. Maintenance of Grass Areas

The developer shall be required to maintain grass areas until all works are completed to the satisfaction of Cork City Council. This will require regular grass cutting at approximately 14 day intervals, applying herbicides along path edges and around obstacles, edging where possible.

7.8 Gradients

Gradients on open spaces shall not exceed one in eight. Steeper slopes will require dense planting.

7.9 Drainage

Drainage of open spaces to be carried out by the developer if deemed necessary by the City Council in order to prevent water logging.

7.10 Maintenance of Trees and Planted Area

The developer shall maintain all planted areas within the development boundaries. Maintenance shall include watering during periods of drought, weeding including spraying with approved herbicides, cultivating, as well as any other horticultural operations

necessary for the proper growth of plants and for keeping the landscape and environment safe and neat in appearance.

At the end of each growing season, plants shall be inspected and all dead, damaged or diseased material shall be removed. Pruning of trees and shrubs shall be carried out as required in accordance with the specifications for each plant species. Replacement and repair of damaged tree ties and stakes shall also be undertaken each year. All debris from maintenance operations shall be removed from site.

7.11 Underground Services

Specifications and conditions for installing and maintaining utility services are given here under, and must be adhered to at all times when working close to trees or in Parks open space areas , amenity walks, etc.

7.12 Fencing

To be provided by the developer in accordance with landscape plan or other planning conditions.

7.13 Seats and Other Fixtures

To be provided by the developer in accordance with landscape plan.

7.14 Playground Equipment

All play equipment shall be manufactured and installed to meet the requirements and recommendations of I.S.EN 1176 2008 Part 1-7, I.S. EN 1177 and PAS 018 1996 or equivalent standard.

7.15 Specifications and conditions for installing and maintaining utility services

- (A) CLOSE TO TREES
- (B) IN OPEN SPACE AREAS

The following document outlines recommended procedures to be adopted by utilities when working in (A) close proximity to trees or (B) on open space areas,

Way leave and accompanying map be submitted to the Parks Department prior to work commencing. Utilities shall consult with the Parks Superintendent, and advise him of the date of commencement of proposed works. The exact route should be marked out on the site and agreed, and any instructions which may arise in this regard are to be followed.

7.15.1 (A) Works in close proximity to trees

Damage to trees caused by failure to comply with the guidelines will result in a charge being levied on the utility company, or contractors /sub contractors employed by the utility company. This charge will reflect the amount of damage sustained and where life / safety of tree(s) is undermined it will include the cost of total replacement and loss of amenity value. These charges will be drawn up by professional parks staff and each case will be assessed

on an individual basis. Also any claims arising in the future as a result of damage to the trees caused by the installation of services will be the responsibility of the utility company involved.

7.15.1.1 Damage to Trees

1. Tree roots keep a tree healthy and upright. Most roots are found in the top 600mm of soil. They often grow out further than the trees height. The majority of these roots are very fine; even close to the tree few will be thicker than a pencil. Most street tree roots grow under the pavement and into front gardens, but they can also grow under the carriageway .If roots are damaged, for example by trenching, the tree may fall or lose its vigor and decline.
2. Likewise tree trunks can easily be damaged so care must be taken when working near them. Practices such as leaning paving slabs against trees, chaining machinery to trees or nailing site notices, fencing etc., to the tree trunks are prohibited. The unplanned removal of branches may adversely affect the balance of the tree and hence its safety.

7.15.1.2 Protecting Roots

1. Establish a protection zone around each tree: (see fig. 1.) Generally excavations in the Protection Zone will not be permitted, however where there is no alternative, special precautions / safeguards must be followed.
2. Excavations outside the Protection Zone indicated in Fig. 1. Can be undertaken by excavator without fear of serious damage to tree roots. Should roots be damaged in this area, prune with a sharp tool (e.g. secateurs or handsaw) making a clean cut.

7.15.1.3 Protection Zone

1. Should it be necessary to run utilities through the Protection Zone, it is essential that there is prior consultation with the Parks Superintendent or his/her representative to agree a programme of works that will minimise damage to the roots and the health and safety of the tree.
2. In general the following conditions will apply for works within the Protection Zone.

Don't excavate with machinery. Use trenchless techniques where possible. Otherwise dig only by hand.

Don't cut roots over 25mm in diameter, unless the City Council Parks Dept. Representative agrees beforehand.

Prune roots which have to be removed using a sharp tool (e.g. secateurs or handsaw). Make a clean cut and leave as small a wound as possible.

Backfill the trench with an inert granular material and topsoil mix. Compact the backfill with care around the retained roots. On non highway sites, backfill only with excavated soil.

Don't repeatedly move / use heavy mechanical plant except on hard standing.

Don't store spoil or building material, including chemicals and fuels.
Frost can damage exposed roots. If trenches are to be left open overnight, cover the roots with dry sacking. Remember to remove the sacking before backfilling.

7.15.1.4 Trenchless Technology / Mole Trenching

In the intensely competitive works of utility contracting, the only sure way of minimising root damage to an acceptable degree is by the use of an appropriate trenchless technology and by specifying its use from the outset. Contractors must be required by the utilities companies who employ them to use this technology.

"In order to avoid damage to roots by the mole, it is recommended that the depth of run should be below 600 mm. Techniques involving external lubrication of the mole with materials other than water (e.g. oil, bentonite, etc.,) should be avoided, unless precautions are taken to ensure that there is no contamination of the soil within 600 mm of the surface within the Protection Zone". (National Joint Utilities Group 4.5.2) April 1995.

7.15.2 (B) Works in open space areas

All excavations in open space areas should be organised in such a manner that will cause the least damage to the existing grass surface. In particular, plant and machinery and imported backfill material should be sited at on location and not scattered throughout the site.

The excavation and other areas occupied by the utility service or nominated contractor during the works should be protected by security / protective barriers and appropriate signs to deter and prevent the public from gaining access to these areas .

7.15.3 Seedbed Preparation

The top 300 mm of material (topsoil) should be excavated first and put to one side, the remaining material should then be excavated and placed on the other side. The reason for this separation is to ensure that the topsoil is not mixed with subsoil and other poor quality material is present.

Prior to the replacement of topsoil, subsoil should be ripped / scarify to a depth of 150 mm. This would include all areas where compaction may have occurred due to driving of / parking of vehicles on grassed surfaces (wheel ruts). Large stones brought to the surface should be picked off and disposed of off site. Return subsoil and other material to the bottom of the excavation, using the topsoil for the remaining 300 mm.

Replacement of topsoil should not be carried out in wet conditions.

After spreading the topsoil, the seed bed shall be prepared / cultivated by hand raking or harrowing with a spike or chain harrow on large areas and light and uniform rolling to produce a fine tilth. All surface stones and debris from 10 mm – 50 mm in any dimension shall be removed from the surface. Finished levels to have fullness under moderate consolidation, to an average of 25 mm above paths, kerbs and manholes.

7.16 Sowing of Grass Seed

No grass seed shall be sown until the cultivation and preparatory works have been approved by the Parks Department.

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Sowing should be carried out during optimum temperature and rainfall conditions (usually March – October) and during suitable calm weather conditions, at a rate of 30 g / m².

The operation should be carried out in equal sowings in transverse directions. A specialised seed sowing machine will ensure higher establishment rates and will also ensure accurate and economical seed distribution.

After sowing the ground should be lightly raked and then firmed with a lightweight roller.

7.17 Sodding / Turfing

In situations where sodding or turfing is carried out, the exact same procedure should be adopted up to the seed sowing stage, except that the final level of the seed bed should be 50 mm (or the depth of the cut sod) below the finished level.

The sod should be cut with a straight edge, be uniform, approximately 500 mm deep and strong enough to hold during handling.

The seed bed receiving the sod should be cut with a clean edge to the exact same width as the sod, so that the two will marry in together.

Lay the sod in straight lines and do not try to bend them round to form curved edge, ensuring that each sod is as close as possible to the proceeding one.

Where the edges of the sod are not even and full, allow a 500 mm overlap and trim with a half moon (sharp edge) to achieve flush joining.

Tamp down gently each row of sod with a tamper made from thick boards and a pole. Check the level with a board and a spirit level if necessary, after tamping down.

If there are any bumps or hollows, the sod should not be heavily rolled and beaten down. The sod should be lifted and any irregularities corrected by adding or removing soil, as necessary.

Apply a sandy soil top dressing mixture between the crevices using either a broom or the back of a rake. This is essential in that it will help the sod knit together.

Grass seed should be sown over the disturbed areas where topsoil has been spread.

Manholes / Junction Box Covers etc., are to be laid slightly below (25 mm) the existing ground level

Trees, shrubs, paths, walls and sports facilities affected by wayleaves are to be dealt with on an individual basis.